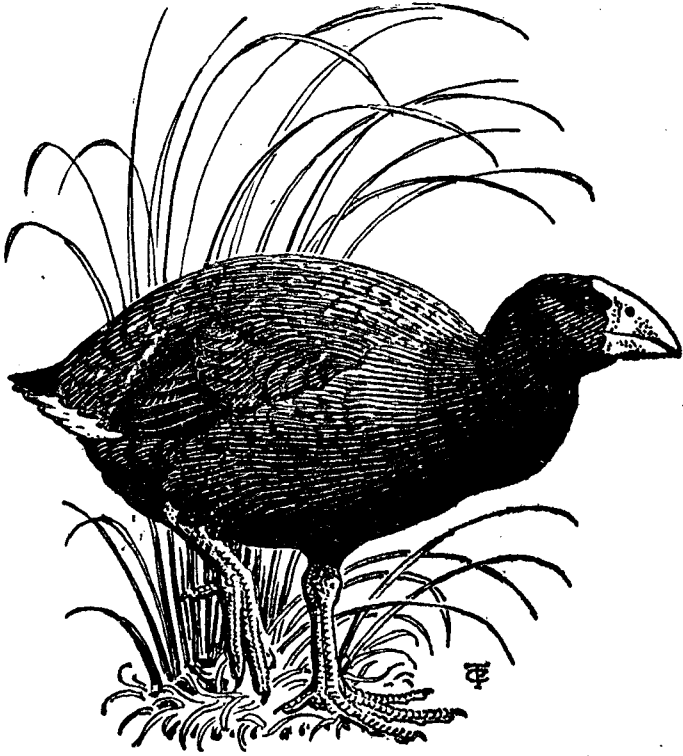


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Contents of Vol. 13, No. 3: September, 1966

A Note on the Techniques of Bird Photography (M. F. Soper and G. J. H. Moon); Introduction by the President	127
Plate VII — King Shags at Duffer's Reef, Cook Strait	128
Plate VIII — Sharp-tailed Sandpipers at Miranda	130
Short Note — Royal Spoonbills at Matata Lagoon, Bay of Plenty	132
Foods Habits of Pukeko (A. L. K. Carroll)	133
Breeding of Song Thrushes and Blackbirds at St. Arnaud, Nelson (J. E. C. Flux)	142
Short Note — The Egg of the Long-tailed Cuckoo	149
Birds of Simmonds Islands (L. J. Wagener)	150
Notes on the Birds of Tutuila, American Samoa (R. B. Clapp and F. C. Sibley)	157
Australian Coots on Virginia Lake, Wanganui (September to May, 1966) (R. Macdonald)	165
The Breeding of Black-backed Gulls in the South Island Mountains (G. Caughley)	166
Wanganui Labour Day Week-end Field Study, 1965	167
Short Notes — Another New Zealand Record of the Glossy Ibis; Cattle Egrets at Lake Ngारoto; A Third North Island Record of the Black-winged Petrel; Another Little Whimbrel at Miranda; Pectoral Sandpipers Inland in Hawkes Bay	169
Reviews — A Sketchbook of New Zealand Birds (Molly Falla); A Field Guide to Fiji Birds (R. Mercer); Instructions to Young Ornithologists IV: Sea-birds (M. E. Gillham)	172
Notes — Note by the Honorary Secretary; A New Treasurer Wanted; Kermadec Expedition, 1966; Note on the Christmas Card	174
Summary — Banding Scheme and Red-billed Gulls	176
List of Regional Organisers	176

A NOTE ON THE TECHNIQUES OF BIRD PHOTOGRAPHY

By M. F. SOPER and G. J. H. MOON

With an Introduction by the President

Many members of the Society have acquired a deep resentment of the bird photographer who regards his or her picture as of paramount importance, regardless of the welfare of the bird and its nestlings. Many cases of desertion and disaster through the actions of bird photographers have become common knowledge: disasters to Gull and Tern colonies, and desertion or predation in the case of Banded Rail, Pigeon, Harrier, Morepork, Silvereye and Fantail are some that come to mind; and how many other cases must go unrecorded! Unnecessary disturbance of Gull and Tern colonies, and remaining too long in the area so that chicks and eggs become destroyed by the sun, have been the cause of severe losses in these species; and the opening up of nests by removing essential cover, the continued use of flash at close quarters, and the improper use of hides, have been causes of desertion or predation in many individual nesting species.

The subject of disturbance of birds by photographers came up for discussion when M. F. Soper, G. J. H. Moon and I were together on Hen Island in November, 1965. These two experienced and highly skilled bird photographers thereupon agreed to produce an article pointing out some of the pitfalls in their art. In this they endeavour to show that bird photography is, or should be, an attitude of mind; they do not attempt in a few pages to instruct the reader in the art, but rightly point out that a study of one of the quoted standard works on the subject is essential. — A.B.

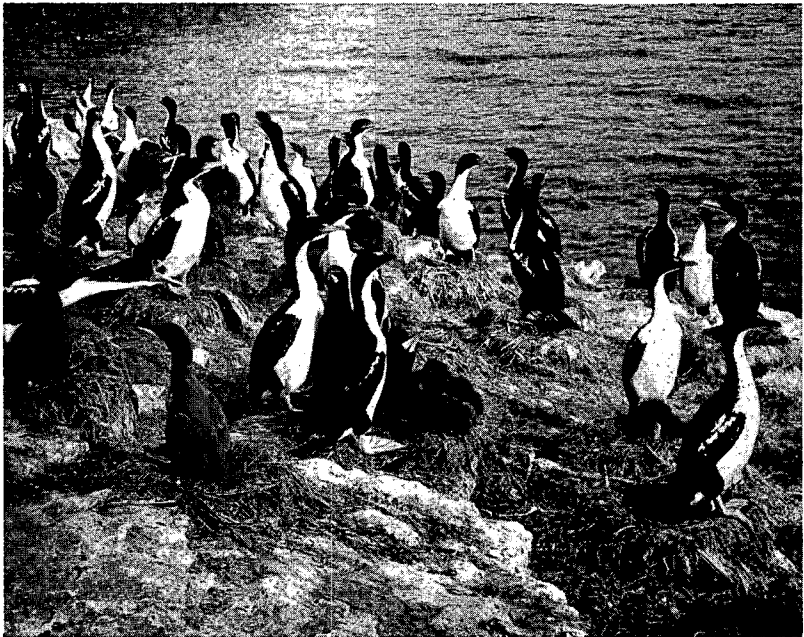
Bird photography today has been revolutionised for the amateur. Modern refinements of camera design, the increased speeds of colour films and, above all, the development of light-weight, transistorised, electronic flash units have combined to make easy what once was difficult: no longer is bird photography the back-breaking, time-consuming province of a few enthusiasts. In itself this is admirable. Anything that aids or entices us to explore and become aware of our wild-life heritage is to be applauded. Unfortunately it is becoming increasingly evident that nesting birds are being subjected to more interference than they will tolerate. This is rarely due — at least, so we hope — to calculated impatience on the part of photographers hungry for quick results but rather to thoughtlessness and carelessness, and an ignorance of what can and can not safely be attempted. Paradoxical though it may seem it is possible in these days of automatic cameras and trade-processed film to undertake photography knowing nothing of the mechanical aspects of photography at all. What is causing concern is that some people behave as though it were possible to take bird photographs knowing nothing of the mechanics of bird-photography either — which is disastrous.

The basic principles of bird photography were laid down many years ago. They have been well and truly tried and they have altered little since their inception. In essence they are to upset the bird's daily

life as little as possible and so to arrange matters that the bird comes or is enticed to a stationary camera. Compliance with the first ensures that at all times the bird is behaving naturally; with the second that the results, when obtained, are as artistically pleasing as the photographer can make them.

Bird photographs today are taken by people who range, in their extremes, from ornithologists who use cameras to photographers who use birds. By and large the best bird photographs are obtained by those with a foot in each camp. The extremists tend either to have trouble with exposure and focus, composition and design, or, if "pure" photographers, to produce technically perfect results of unhappy birds. The point to be made, I think, is that bird photography is a technique in its own right — and should be an obsession. It should not — as it is in danger of becoming — be the Sunday afternoon pastime, in a gull colony, of a camera owner looking for something "unusual."

Most bird photographs of course are taken at nests. Not only is there then the added interest of the young but there is the simple fact that by and large photographs at nests are the easiest to obtain. But birds can be photographed at many places and the tendency today is to make greater use of feeding tables, water holes, food supplies, roosts, high tide resting-places and baits in an endeavour to portray as many aspects of a bird's daily life as possible.



[M. F. Soper

No matter where the photography is planned some method of concealment will generally be necessary, and for this purpose a "hide" is used. A hide is any structure in which the photographer can conceal himself and his equipment. Hides may be made of materials at hand or they may be prefabricated. The latter is the more satisfactory, for prefabricated hides are easily and rapidly erected, easily transported and always available. They allow also the incorporation of various refinements to make the hours inside them more comfortable. But whatever their construction, they must be rigid and they must be "light proof."

Most hides are between three and four feet square and about six feet high. Naturally no bird is going to ignore the sudden appearance of a structure of these dimensions, and for this reason the hide must *never* in the first instance be erected close to or right on top of a nest. It is true that provided the hide does not flap in the wind, some birds, after an initial period of suspicion, will return apparently unconcerned, but these birds are few.

Whenever a hide is erected you *must*, one or two hours later, go back and check that the birds are not still disturbed by it; or if the nest is in the open, e.g. dotterel or stilt, observe the bird from a distance with binoculars. If the hide has not been placed too close to the nest, such birds will return to the nest within ten minutes or so. If they are unduly disturbed, the hide *must* be removed, or moved much further away. This is an absolute rule. It is not so essential if the hide is being used at, say, a high tide roost for in that case desertion of the roost and the use of another merely upsets the photographic plans, but it is mandatory in the case of a hide at a nest. Once you decide to use a nest to obtain photographs then you assume responsibility for the continued welfare of that bird and its young.

Most New Zealand birds will accept a hide readily, but there are a number that won't — notorious amongst them being the Harrier, Bittern, Herons and Shoveller, with others such as the Pukeko and Kingfisher that can be difficult — so it is necessary, always, to be distrustful. Were I erecting a hide at the nest of a Pukeko for example I would put it in the first instance at least twenty paces away and then over the next three or four days gradually move it closer by halving the distance each day.

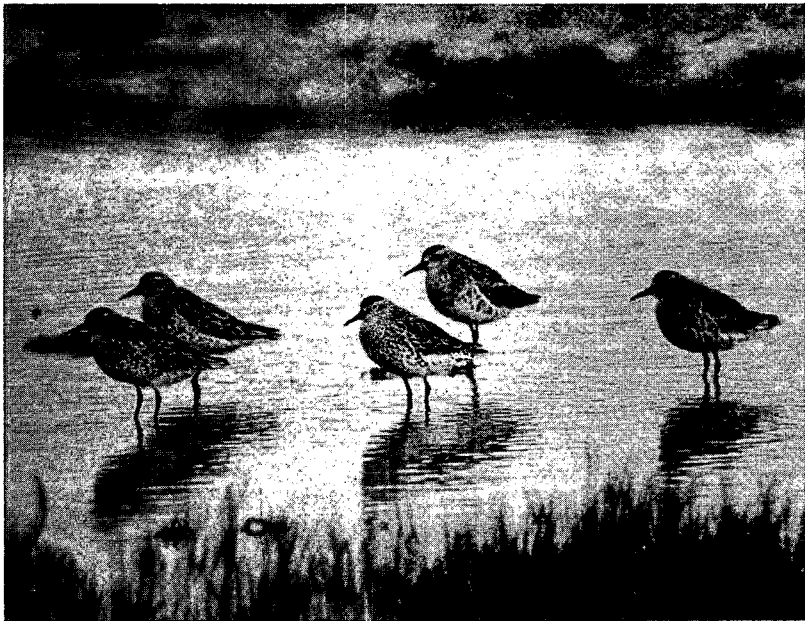
Never assume that a bird will accept a hide. If there is but the slightest doubt — and there will always be when a species is first being done — erect the hide in the first instance at a distance; then move it closer when the effect has been observed.

At this point I would refute the belief that bird photographers need the patience of Job. Patience they do not need; what they need is *time*. Time to erect hides. Time to return and check that all is well. Time to move the hides closer. Time to return and check yet again . . . and so on. If a photographer ever finds it necessary to wait long hours in a hide for a bird to return to its nest then there is something radically wrong with his "hide." Exceptions do occur with such birds as herons with older chicks, which visit to feed perhaps only at intervals of four or five hours.

Camouflage of a hide is seldom necessary — not, at least, from the point of view of the bird, though it may be useful to disguise it from the curious eyes of passers by. All the bird is concerned with

is the sudden appearance of a bulky object, camouflaged or not. Nevertheless, if camouflage material is readily available I always use it as it helps overcome the problem of wind. Wind can be a curse. Infinite pains must be taken to ensure that the hide does not flap: guy-ropes from each corner, stones around the bottom, uprights driven firmly into the ground, a weight on the roof, branches stuffed behind ropes encircling the canvas — all these, plus any other measures that present themselves, need to be taken. Never forget that New Zealand is a land of wind and that the calm present when the hide is erected is unlikely to persist.

Having had the hide in its final position accepted by the bird the next stage is its occupancy. At this stage it is often advisable — and in some instances essential — to have a second person accompany you to the hide with the view, after you are quite settled, of ostentatiously leaving the area and so deluding the birds into assuming that the coast is again clear. It is, for example, obviously quite futile to trudge laden with equipment across a wide, open river bed to a hide at an oystercatcher's nest and to expect the oystercatcher to return unconcerned when, after much ducking in and out, you finally get settled. What is not so readily realised is that many bush and scrub birds are equally as interested spectators of your antics and equally as aware of the fact



[G. J. H. Moon

VIII — Sharp-tailed Sandpipers at Miranda, Autumn 1966 Breeding dress, indicated by increased spotting on breast and flanks, is assumed before they leave for Siberia.

that you have disappeared into the hide and not yet emerged. Once established in the hide do not forget that the hide structure will need pulling tight again to prevent flapping. This is extremely difficult to do single handed from the inside of the hide and is, indeed, one of the most useful services an assistant can do for you.

Most nests will need a certain amount of "tidying up" — "gardening" is the term generally employed. In the case of ground nests such as those of stilts and oystercatchers this is generally simply a matter of removing a few distracting white stones and straws from the *background*; a quite harmless procedure. In the case of nests situated in dense cover, however, the matter is not so simple. There is a very real danger here of converting "tidying up" into "opening up," and of doing so much that the bird deserts. The guiding principle is to do as little as possible. Many nests are impossible to garden and if it appears that much will need doing the nest should not be attempted. Quite apart from the risk of desertion, of attracting predators, and of letting in so much sunlight that the chicks literally cook, it needs to be remembered that photographs at over-gardened nests are not only scientifically false but also aesthetically displeasing in that the gardening is always evident to the trained observer. The more I do bird photography the more I become aware how important these aspects are. I now rarely "garden" at all. I much prefer to continue nest-finding till a nest is discovered that does not require interfering with.

The photographer's conduct in the hide calls for little comment. Obviously silence is essential — at least till he has discovered what liberties he can take, and obviously there must be no visible movement (which means that the hide must be pulled tight and that the camera must be on a tripod — *not* held in the hand!) His method of leaving the hide however, requires mention. If further sittings are envisaged it will be wise to prearrange for someone to return after a given lapse of time. Obviously were the photographer suddenly to appear from the rear of the hide he could run the very real risk of demolishing all that confidence on the part of the bird which, over the previous few days, he had been so carefully building up. He could well undo a week's work.

One of the major changes in the technique of bird photography over the last few years has been the use of electronic flash. The flash is used not so much to stop action — indeed the units commercially available in New Zealand today are too slow for this — but to provide light. For this purpose electronic flash is a boon; such a boon in fact that it is in danger of being abused. The temptation is to use flash all the time, even when not really necessary. Not only does one then obtain a number of very artificial-looking results — for flash has to be very well handled indeed if it is to simulate natural lighting — but it produces the temptation to "flash" the bird every time it arrives at the nest. The bird is given no respite. It takes very little of this to produce photographs which, though technically perfect, are obviously of unhappy birds.

If flash is to be used not only do the birds have to be accustomed to the presence of the hide but they have also to be accustomed to the presence of the flash reflectors. Flash can rarely be used on the spur of the moment. Like all aspects of bird photography flash requires care and time and planning.

So much, if very briefly, for the technical aspect of bird photography. But there is much more to bird photography than mere technique. Bird photography is a complex mixture of art, science, aesthetics, trophy-hunting, "escapism," and the desire to communicate, to mention a few of the more obvious ingredients. Above all it is something that requires honesty of presentation, scientific accuracy and a sympathetic regard for its subject matter. Without these the final photograph will satisfy neither its author nor its audience. It is not sufficient to be knowledgeable about photography (and it is against such, I suspect, that O.S.N.Z. members rail most), nor is it sufficient to be knowledgeable about birds; (indeed, in my experience, the supposed ornithologically knowledgeable person is often a greater menace than his more photographically minded counterpart); to undertake the photography of birds it is necessary to be knowledgeable about "bird photography," a skill in its own right and something that has to be learnt.

For those wishing to pursue the subject there are a number of books available. Particularly recommended are:—

"Bird Photography as a Hobby" Eric Hosking and Cyril Newberry.

"Bird Photography" G. K. Yeates.

"Bird Photography" John Warham.

In my opinion, one or other of these books is as essential to the bird photographer as is his camera, tripod, binoculars and hide.



SHORT NOTE

ROYAL SPOONBILLS AT MATATA LAGOON, BAY OF PLENTY

On 12/6/66, having learned of the presence at the above wild life sanctuary of three 'white herons,' we sallied forth from Rotorua to investigate the occurrence.

For a number of years there has been a paucity of *Egretta alba* in this region. Our party included two members of the O.S.N.Z., Wally Broun, his wife, Margaret, Max Black and wife, Muriel. Almost immediately on arrival we spotted two large white birds, which at first glance we took to be herons. They were feeding in the water along the opposite shore, just below the bridge. Their manner of feeding was quite unlike that of the heron tribe and more akin to that of Spoonbills (*P. regia*), and that is just what they proved to be.

As we watched them through 7 x 50 binoculars a Great White Egret came "out of the blue" and joined the Spoonbills. It also started to feed in the typical manner of its kind. The mode of stance adopted by both species whilst feeding is apparently diagnostic. In the case of *E. alba* the body slopes downward at an angle of c. 45°, but with *Platalea* the body stand is horizontal. However, the Spoonbill while at rest does assume a more heron-like attitude, as we have observed in the Manawatu Estuary at Foxton Beach.

This is not the first record of the Royal Spoonbill from the Bay of Plenty. In 1961, two were reported from east of Opotiki (*Notornis* 9, 240).

— W. J. BROUN

— M. J. S. BLACK

FOOD HABITS OF PUKEKO (*Porphyrio melanotus* Temminck)

By A. L. K. CARROLL*

SUMMARY

An examination was made of the contents of 298 Pukeko gizzards collected between February 1963 and August 1964. Specimens were from Rotorua, Canterbury and Nelson-West Coast. Food consisted almost exclusively of plant material, most important in all three districts being grasses and sedges. Predominant grasses were *Poa* spp., *Glyceria* spp. and *Anthoxanthum odoratum*; sedges, *Scirpus* spp., *Eleocharis* spp. and *Carex* spp. All parts of these plants were eaten. Leaves of clover (*Trifolium* spp.), seeds of dock and sorrel (*Rumex* spp.), seeds of willow-weed (*Polygonum* spp.) and seed-heads of rush (*Juncus* spp.) were also frequently taken. Animal material was sparse. Spiders (*Arachnida*), beetles (*Coleoptera*), flies (*Diptera*) and other insects predominated. Earthworms (*Annelida*), peripatus (*Peripatus novae-zealandiae*), wood-lice (*Isopoda*) and fragments of lizard and bird bones were occasionally found. Although grit occurred at all times, a greater weight was taken in winter and early spring.

INTRODUCTION

The Swamp-hen or Pukeko (*Porphyrio melanotus* Temminck) is indigenous to New Zealand. Primarily a swamp-dweller, it can adapt itself to a variety of conditions; thus, where its habitat has been modified by drainage and cultivation of wetlands it may be found foraging on pasture-land or in scrub, though rarely far from water.

Buller (1873) referred to its feeding habits thus:— "It subsists principally on soft vegetable substances, but it also feeds on insects and grain. By the aid of its powerful bill it pulls up the inner succulent stems of the raupo, or swamp-reed, and nips off the soft parts near the root, holding the object in the toes of one foot while feeding, something after the manner of a Parrot." Oliver (1955) reported that its diet also included such items as fish, frogs, lizards, birds and birds' eggs. These observations have been supported by many others. There have frequently been lively conflicts of opinion about the amount of damage caused by Pukekos. Acclimatization societies advocate protection of the birds, whereas many farmers claim that their depredations in pasture, crops and chicken runs warrant their destruction in areas where they are numerous. As a result of this conflict the Department of Internal Affairs in 1931 arranged for an investigation into their food habits (Muggeridge and Cottier 1931). Gizzard contents of 63 birds collected from Auckland, North Canterbury, Southland and Otago were analysed and the results tabulated. This study indicated that Pukekos were primarily vegetarians, although the authors pointed out that soft-bodied insect material might remain for less time than plant material in gizzards, thus giving a somewhat distorted result.

The study was inconclusive as samples were small and their distribution wide. Thus, with the problem not fully resolved, arguments continued and in 1962 the Department decided that a fuller investigation was required.

* Research Section, Wildlife Service, Dept. of Internal Affairs, Wellington

MATERIAL

Birds were collected by Mr. G. Tunncliffe of Canterbury University and by field staff of the Rotorua District office of the Department of Internal Affairs.

Mr. Tunncliffe supplied gizzard contents preserved in 70 per cent. alcohol. These were subsequently washed, dried, sorted, weighed and organic material identified. A total of 171 gizzards, collected between February 1963 and January 1964, were from the following localities:— Ellesmere area (59), Bennetts (21), Kaituna Lagoon (12), Bellfast (5), Waimo Lagoon (3), Hurunui River (2), miscellaneous (7), Waimea County (6), Hokiitika area (23), Whataroa (3), Ahaura (4), West Coast unspecified (26).

Whole birds, frozen as soon as possible after death, were sent from Rotorua. Approximately twelve a month were obtained between May 1963 and August 1964. The gizzards of 127 of these were examined, the others being either damaged or empty. Rotorua specimens came from:— Matata (35), Opotiki (32), Tokoroa (11), Galatea (11), Kawerau (10), L. Rotorua environs (9), Gisborne (4), L. Rere-whakaitu (4), Reporoa (4), miscellaneous (7).

Whenever possible Rotorua birds were taken in approximately equal numbers from indigenous habitat and cultivated farmland. Over the whole year they were collected as follows:— Swamp (42), Pasture and Swamp (59), Pasture (12). The remainder were from unspecified habitats.

Table I

PUKEKOS — ALL BIRDS 1963-64

Mean and percentage weights of grit and dried plant material in gizzards

Month	No. of Specimens	Grit		Dried Plant Material	
		mean wgt. in gms	percentage wgt.	mean wgt. in gms	percentage wgt.
May	43	7.2	88	1.0	12
June	34	8.5	91	0.9	9
July	38	7.8	91	0.8	9
Aug.	31	8.0	92	0.7	8
Sept.	35	6.9	91	0.7	9
Oct.	19	5.1	91	0.5	9
Nov.	16	6.5	91	0.5	9
Dec.	20	5.7	83	1.0	17
Jan.	23	4.1	72	1.6	26
Feb.	11	5.7	86	0.9	14
Mar.	20	5.3	80	1.4	20
Apr.	6	5.0	83	1.0	17

Tables were prepared to show the frequency of occurrence of all foods in all gizzards on a monthly basis, these being subsequently condensed into seasonal occurrences of main food groups in all birds, expressed as a percentage (Tables II, III, IV, V). Grit is expressed as a percentage of the total weight of gizzard contents of all birds (Table I). Identification of animals was based on Parker and Haswell (1940), Powell (1947) and Imms (1947 and 1951) and that of plants on Martin and Uhler (1939), Allan (1940), Hubbard (1954), Hamlin (1955), Hyde (1957), Caldwell (1960), Martin and Barkley (1961), Mason (1964) and on information supplied by G. Tunnicliffe.

GRIT

Grit occurred in all gizzards and usually comprised the greater part by weight of the contents (Table I). Particles varied in size from fine sand to stones 5 mm. in diameter. As a percentage of total dry weight of gizzard contents grit increased in winter and early spring, attaining a maximum of 92 per cent in August and a minimum of 72 per cent in January. Only Rotorua figures were available for a study of wet weights. These showed a maximum of 58 per cent in August and a minimum of 34 per cent in March. The maximum mean monthly weight per gizzard was 8.5 gm. in June and the minimum 4.1 gm. in January. The mean weight of grit ingested during winter and early spring (May-October) was 33 per cent greater than in November-April. It appears that extra grit may have been needed for grinding fibrous vegetative material eaten in winter, whereas hard seeds, such as those of sedges and members of the Polygonaceae taken predominantly in summer and autumn, would act in part as their own grinders.

ANIMAL MATERIAL

Seventy-five (25 per cent) stomachs contained animal material, but, with the exception of four, only in minute amounts. Probably some was ingested accidentally, e.g. spiders among grass stalks and beetles at the roots of plants. Notwithstanding that soft parts of animals bodies would soon disintegrate in the gizzard, it was clear that the significant portion of Pukeko diet was not of animal origin.

Insect fragments were found in 64 specimens, spiders in 36, earthworms in five and bone in four. In three gizzards the bone fragments came from lizards, in the fourth from a bird.

Insects. Most frequently occurring were ground-dwelling beetles in adult and larval forms, flies adult and larval, grasshoppers and crickets, water-boatmen and insect eggs.

Spiders. Two kinds occurred, by far the more common being harvestmen (*Phalangidae*). A few nursery spiders (*Dolomedes minor*) and their nests were found.

Earthworms. These rapidly disintegrated in the gizzards but were identifiable by the presence of setae.

Other animal material was from various sources. *Peripatus novae-zealandiae* occurred twice, wood-lice twice, fragments of a gastropod shell once and lepidopterous larvae three times.

Table II
 ROTORUA PUKEKOS 1963-64
 Number of occasions of eating of plant foods

Season	May June July	Aug.Sept. Oct.	Nov.Dec. Jan.	Feb.Mar. April	Total	Total occurrences as percentages
No. of gizzards	52	37	15	23	127	100
<u>Seeds</u>						
Sedge	30	12	7	17	66	52
Rush	2	7	6	14	29	23
Grass	5	6	14	12	37	29
Polygonaceae	23	9	2	15	49	38
Other dicoty- ledons.	12	7	3	9	31	24
<u>Vegetative</u>						
Sedge and rush	41	25	5	10	81	64
Clover	12	15	4	9	40	31
Grass	30	33	15	16	94	74
Other Plants	4	3	-	3	10	8

Table III
 CANTERBURY PUKEKOS 1963-64
 Number of occasions of eating of plant foods

Season	May June July	Aug.Sept. Oct.	Nov.Dec. Jan.	Feb.Mar. April	Total	Total occurrences as percentages
No. of gizzards	40	24	32	14	110	100
<u>Seeds</u>						
Sedge	5	7	16	2	30	27
Rush	-	2	2	1	5	45
Grass	8	3	9	3	23	21
Dicotyledons	6	6	9	2	23	21
<u>Vegetative</u>						
Sedge and rush	20	16	23	11	70	65
Clover	15	12	1	1	29	26
Grass	26	15	15	6	62	56
Other plants	4	1	3	-	8	7

PLANT MATERIAL

Plant material comprised the bulk of Pukeko food at all times. The monthly mean dry weight reached a minimum of 0.5 gm. in October-November and a maximum of 1.6 gm. in January (Table I). The temporary drop in February was not significant as the sample size was small. Rotorua data showed no related change in body weight, state of moult or feeding pattern.

A study of 64 Rotorua birds, for which time of shooting was recorded showed the greatest mean dry weight of food was taken in early morning (sunrise + 3 hours), less at mid-day and least in late afternoon (sunset - 3 hours) see Table VI.

Table IV
NELSON - WEST COAST PUKEKOS 1963-64
Number of occasions of eating of plant foods

Season	May June July	Aug.Sept. Oct.	Nov.Dec. Jan.	Feb.Mar. April	Total	Total occurrences as percentages
No. of gizzards	23	24	14	-	61	100
Seeds						
Sedge	1	1	7	-	9	15
Rush	-	6	4	-	10	16
Grass	2	13	11	-	26	43
Dicotyledons	7	3	4	-	14	23
Vegetative						
Sedge and rush	8	11	5	-	24	39
Clover	11	14	6	-	36	51
Grass	20	19	13	-	52	85
Other plants	1	1	1	-	3	5

Eight of the eleven morning specimens were shot in summer when seeds were most frequently eaten; 25 of 29 afternoon specimens in winter and spring when vegetative material predominated; mid-day specimens were collected throughout the year. Allowing for possible distortion of results by unequal sampling, it appears that Pukekos forage at all times of the day although perhaps less in afternoon and evening.

Seeds and vegetative parts of plants have been listed separately as it was found that often only one portion of a plant was eaten; e.g. clover leaves were present in 105 stomachs but clover seeds occurred in only five. (Tables II, III, IV and V.)

Grasses. These were the most abundant material and many species occurred in samples from all three districts. *Poa* spp. occurred most

frequently: *P. annua* and *P. trivialis* in all districts, *P. pratensis* in Canterbury. Second in importance were *Glyceria fluitans* and *G. maxima* in Rotorua, *Holcus lanatus* in Canterbury and *Anthoxanthum odoratum* in Nelson-West Coast. Grass occurred in 207 (70 per cent) of the 298 gizzards. There appeared to be no preferential selection of grass seeds as items of food; instead they were always associated with other parts of the plant. Most favoured portions were the tender stalk-bases, although often the whole plant was eaten, being snapped by the sharp beak of the Pukeko into approximately quarter-inch sections as if by a pair of scissors. Usually only fibrous roots and occasional leaves were found entire.

Sedges. Vegetative parts of sedges appeared in 168 (56 per cent) of gizzards. Not only were stalks, leaves and rootstocks eaten, but the fleshy tubers, whole or fragmented, were often found to form the bulk of a meal. Sedge seeds frequently occurred in considerable quantities. *Eleocharis sphaecelata* predominated in Rotorua gizzards and *E. gracilis* and *E. neo-zelandica* in Canterbury. *Scirpus* spp. seeds also occurred in many gizzards from these two districts:—*S. caldwellii*, *S. medianus*, *S. lacustris* and *S. americanus* from Canterbury. *Carex* spp. seeds were infrequent in Rotorua and Canterbury specimens but predominated among Nelson-West Coast sedges. They belonged to three species: *C. testacea*, *C. virgata* and *C. leporina*. Other sedge seeds were from *Cladium junceum*, found in eleven Rotorua gizzards and *Mariscus ustulatus* in four.

Rushes. Seeds occurred in 44 (15 per cent) of all stomachs, five from Canterbury, 29 from Rotorua and ten from Nelson-West Coast. In all three districts *Juncus bufonius* and *J. maritimus* predominated. Usually seed heads containing the seeds were taken although vegetative material was sometimes present.

Clover. Dicotyledonous leafy material found in gizzards was almost exclusively clover. It occurred in 105 specimens (34 per cent) and was particularly important in the diet of Nelson-West Coast birds, appearing in 36 (51 per cent) of the 61 specimens compared with 29 (26 per cent) in 110 from Canterbury and 40 (31 per cent) in 127 from Rotorua.

Willow-weeds, docks and sorrel. In all three districts seeds of *Polygonum* spp. and *Rumex* spp. were frequently taken. Usually these occurred without vegetative parts of the plants and thus appeared to have been specifically selected. Vegetative fragments of *Rumex* spp. were found twice in Canterbury and twice in Nelson-West Coast specimens. Rotorua species were *Polygonum hydro Piper* and *P. persicaria* in 25 specimens, *Rumex acetosella* and *R. crispus* in 24. Canterbury species were *Polygonum persicaria*, *P. aviculare* and *P. hydro Piper* found in 12 specimens and *Rumex crispus*, *R. acetosa* and *R. acetosella* in four specimens. Nelson-West Coast species were *Polygonum hydro Piper*, taken once, and *Rumex acetosella* and *R. crispus* seven times.

Seeds of many other plants were found but their occurrence was infrequent and usually sparse. *Bidens tripartitus* seeds were numerous in six Rotorua gizzards; *Stellaria media* occurred in four from Rotorua and one from Canterbury. *Ranunculus* spp. were found in three Rotorua gizzards, four from Nelson-West Coast and one from Canterbury. *R. sardous* came from Rotorua, *R. sceleratus* from all three districts and *R. bulbosa* from Canterbury.

Miscellaneous seeds occurring more than once were *Taraxacum officinale* (4), *Trifolium* spp. (5), *Portulaca oleracea* (2) and *Coprosma* sp. (3).

Aquatic Plants. These were found infrequently. Rotorua gizzards contained *Salvinia natans* (5), *Lemna minor* (1) and *Zannichellia palustris* (1). Canterbury gizzards contained *Potamogeton pectinatus* (3), *Zannichellia palustris* and *Elodea canadensis*.

SEASONAL CHANGES IN DIET

These were confined mainly to the frequency with which seeds were eaten. At all times vegetative parts of grass and sedge were taken more often than other foods. The incidence of clover leaves showed a marked variation, being highest during the August-October period (Table V). As would be expected, seeds were eaten more in summer and early autumn, with grass seeds predominating in November-January and seeds of all kinds in the February-April period.

Table V
PUKEKOS — ALL BIRDS 1963-64

Number and percentages of occasions of eating of plant foods*

Season	May June July	Aug.Sept. Oct.	Nov.Dec. Jan.	Feb.Mar. April	Total
No. of specimens	115	85	61	37	298
<u>Seeds</u>					
Sedge	36(31)	20(24)	30(50)	19(51)	105(35)
Rush	2(2)	15(18)	12(20)	15(41)	44(15)
Grass	15(13)	22(26)	34(56)	15(41)	86(29)
Polygonaceae	32(28)	16(19)	9(15)	16(48)	73(25)
Other dicoty- ledons	16(14)	9(11)	16(26)	10(27)	51(17)
<u>Vegetative</u>					
Sedge and rush	69(60)	52(61)	33(54)	21(57)	175(59)
Clover	38(33)	41(48)	11(18)	10(27)	100(34)
Grass	76(67)	67(79)	43(70)	22(60)	208(70)
Other plants	9(8)	5(6)	4(7)	3(9)	21(7)

* Numbers in brackets are percentages.

FOOD SELECTION OF ROTORUA PUKEKOS

As most Pukekos from Rotorua were from specified habitats an attempt was made to determine how selective they were when taking food. Habitat designation was swamp, swamp and pasture and pasture. Table VII shows the number of birds from each habitat containing swamp plants only, pasture plants only or both.

TABLE VI
Mean dry weight of plant food taken at different times of day

Time	Sunrise + 3	Mid-day	Sunset - 3
No. of specimens	11	34	29
Mean weight dried plant	1.3 gm.	1.0 gm.	0.8 gm.

TABLE VII

Number of Gizzards containing	Habitat			
	Swamp	Swamp & Pasture	Pasture	Total
Swamp plants --- ---	18	18	2	38
Swamp & pasture plants ---	8	37	15	60
Pasture plants --- ---	3	6	2	11
Total --- ---	29	61	19	109

Three birds of 29 from swamp habitat contained pasture plants exclusively and two of 19 from pasture contained swamp plants exclusively, indicating that they may have recently moved into the locality where they were shot. Of 61 from mixed swamp and pasture, 18 contained swamp plants only and 6 pasture plants only. Without further information about movements before death it was impossible to define the limits of their feeding range. Considering gizzard contents in relation to habitat, 82 per cent of 109 birds studied had clearly had recent access to both swamp and pasture. Of these, 22 per cent had taken swamp plants only and 19 per cent pasture plants only and the rest contained both.

It would be possible to infer from these figures that Pukekos feed more often in swamp than pasture when both are available. However, the inference could well be invalid as two vital factors are missing — the relative amount of different kinds of food consumed and the comparative availability of these foods in the collection area.

As there were no trained staff carrying out field investigations to complement laboratory work, labels accompanying specimens provided the only information about habitat. Thus a community designated as pure swamp may have included some pasture plants, conversely sedges and rushes might occur in pasture. In mixed communities the proportion of swamp- to pasture-plants was unknown, and would certainly have varied with the locality.

Most plant material found in gizzards was macerated, making a quantitative analysis impracticable, thus results were necessarily limited to qualitative analyses and frequency of occurrence of foods.

From a study of available data it appears that Pukekos forage as they move about in a habitat which normally includes swamp, damp pasture and grassland. Seeds, predominantly those of sedge, rush, grass, sorrel and dock, are eaten in season. Grasses, clover leaves and the more tender portions of swamp plants form their staple diet throughout the year.

CONCLUSION

The result of this investigation substantiates findings of previous workers, namely that Pukekos are primarily vegetarian. Animal material occurred in small amounts and appeared to be of little significance.

It was not possible in this study to determine whether Pukekos preferred swamp- to pasture-plants although some foods were clearly more acceptable than others.

Plants eaten were limited to those growing in swampland or pasture, with sedge, clover and grass predominating. All parts of sedge and grass plants were taken, including their seeds, but usually only leaves and leaf stalks of clover were found. Seeds of willow-weeds and docks and seed heads of rushes occurred with moderate frequency. A variety of other plants appeared in gizzards but their occurrences were infrequent, usually sparse and clearly had little effect on the basic constitution of Pukeko diet.

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BREEDING OF SONG THRUSHES AND BLACKBIRDS AT ST. ARNAUD, NELSON

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INTRODUCTION

Where the Travers river runs into Lake Rotoiti, Nelson Lakes National Park ($41^{\circ} 50'S$, $172^{\circ} 50'E$), there is a flat, 180-acre area (Fig. 1) of introduced grasses with scattered matagouri shrubs (*Discaria toumatou*). This grassland appears to be partly natural and partly the result of fire and grazing by sheep and cattle. It lies at an altitude of 2,000ft. and is surrounded on three sides by extensive beech forest (*Nothofagus* spp.) on mountains rising to 6,500ft., and on the fourth by Lake Rotoiti. The annual rainfall is about 70 inches. Snow seldom lies for more than a few days and may fall at any season. Winter frosts of 10 to 20°F. are normal.

Song Thrushes (*Turdus ericetorum*) are abundant on this isolated piece of grassland. A few are found on small clearings further up the Travers river, but they are rare on alpine grassland at 4,500 ft. Blackbirds (*Turdus merula*) are also plentiful on the grassland in the valley, but are more evenly distributed through the beech forest than Thrushes and more often seen above the timberline.

METHODS

The author was stationed at St. Arnaud for 18 months and about one week was spent in the area every month from October 1962 to December 1965. Dr. P. C. Bull suggested that the opportunity should be taken to collect breeding data from this somewhat unusual population



Fig. 1 — Travers Valley, showing grassland with clumps of matagouri in foreground and beech forest on the surrounding mountains.

of Thrushes and Blackbirds living mainly in native vegetation and at a relatively high altitude. During the breeding season nests were looked for on 17 days in 1963, 25 days in 1964 and 19 days in 1965, at irregular intervals. From 1963 to 1965 186 Thrush and 38 Blackbird nests were found, mostly in the study area but including 24 Thrush and 9 Blackbird nests from around St. Arnaud township, which is about six miles north and similar in altitude and habitat. Trees containing nests were lightly blazed and numbered in pencil. Nest Record cards were completed for all nests and deposited in the Society's collection. Although an analysis of Thrush and Blackbird cards for the whole of New Zealand is in preparation, it was thought worthwhile to summarise the main results from this rather atypical area separately, and compare them with those of an earlier study near Auckland by Bull (1946).

NEST SITES

The nest sites of Thrushes and Blackbirds did not differ significantly although Thrushes tended to favour *matagouri* (Table 1).

TABLE 1 — Comparison of nest sites of Song Thrush and Blackbird

Site	Song Thrush			Blackbird		
	No. of Nests	%	Mean Height ft	No. of Nests	%	Mean Height ft
Matagouri	98	63.2	7.0	18	48.7	6.4
<i>Coprosma</i> sp.	24	15.5	5.1	4	10.8	5.8
Beech	17	11.0	12.8	5	13.5	11.6
Manuka (<i>Leptospermum scoparium</i>)	5	3.2	6.2	4	10.8	7.0
Broadleaf (<i>Griselinia littoralis</i>)	1	0.7	10.0	2	5.4	10.0
Other species	7	4.5	6.4	3	8.1	11.0
On ground	3	1.9	0	1	2.7	0
Total	155	100	7.2	37	100	7.4

Three Thrush nests were constructed on top of previous years' nests. Only one nest was used for two clutches in the same year.

NEST MATERIALS

Although nesting in similar sites on the same area, Thrushes and Blackbirds chose different building materials (Table 2).

TABLE 2 — Composition of 136 Song Thrush and 35 Blackbird Nests

Component	Song Thrush		Blackbird	
	Times recorded	%	Times recorded	%
Grass	128	42.1	25	28.1
Lichen	61	20.1	1	1.1
Twigs	39	12.8	14	15.7
Moss	35	11.5	24	27.0
Wool	30	9.9	7	7.9
Roots	7	2.3	13	14.6
Bracken	3	1.0	0	0
Bark	1	0.3	5	5.6

Thrushes seemed to prefer dry grass, while Blackbirds used more roots and twigs. Perhaps the most noticeable difference is in the use

of lichen (*Usnea* sp.). This grows abundantly on matagouri bushes but is generally not used by Blackbirds which take moss from the ground instead.

POPULATION DENSITY

Only in 1965 was an attempt made to cover the whole area systematically. Eighty-nine Thrush and 19 Blackbird nests were found containing eggs or chicks on the 180-acre area, a density of 25 and 6 pairs per 100 acres respectively, assuming two clutches per pair. At least 20 empty Thrush nests were also found which seemed to have been deserted before laying began. More Blackbirds than Thrushes were seen on the area and more Blackbird nests may have been missed as they are harder to find. Bull (1946) estimated that on Auckland farmland there were 31 pairs of Thrushes and 22 pairs of Blackbirds per 100 acres.

BREEDING SEASON

The date of the first egg laid was estimated from the incubation or fledging period for nests not found during laying, as described by Myres (1955). This was done for all occupied nests, even if visited only once (Table 3).

TABLE 3 — Estimated date of first egg in 121 Song Thrush and 28 Blackbird clutches

Date	Song Thrush				Blackbird				
	1963	1964	1965	Total	1963	1964	1965	Total	
Sept. 8 - 15	---	2		2					
16 - 23	---	1	6	3				10	
24 - 30	---	2	9	13				24	
Oct. 1 - 7	---	2	7	3		1	1	2	
8 - 15	---	3	2	3		1	0	3	
16 - 23	---	4	4	1	1		5	1	
24 - 31	---	6	3	7	1		3	6	
Nov. 1 - 7	---	3	2	4	2		2	4	
8 - 15	---	1	1	10	1		4	5	
16 - 23	---	4	1	5	1		1	2	
24 - 30	---		0	2			1	2	
Dec. 1 - 7	---		2	4				6	
8 - 15	---			1				1	
Total	---	28	37	56	121	6	3	19	28

Too few clutches are available to justify comparison between years, but Blackbirds seemed unusually late in nesting in 1963. The combined data are used in Fig. 2 to compare the breeding seasons at St. Arnaud and Mangere, Auckland (Bull, 1946). Both species start laying about a month later at St. Arnaud than in Auckland, and Bull even records a few Thrushes laying in mid-winter in June and July. This difference is to be expected from the more severe climate at St. Arnaud, with increased altitude and latitude, although Gurr (1954) did not find that Blackbirds bred significantly later at Dunedin than elsewhere in New Zealand. It is interesting that breeding starts more rapidly at St. Arnaud, so that the peak laying period, 24 - 30 September, is the same as in Auckland.

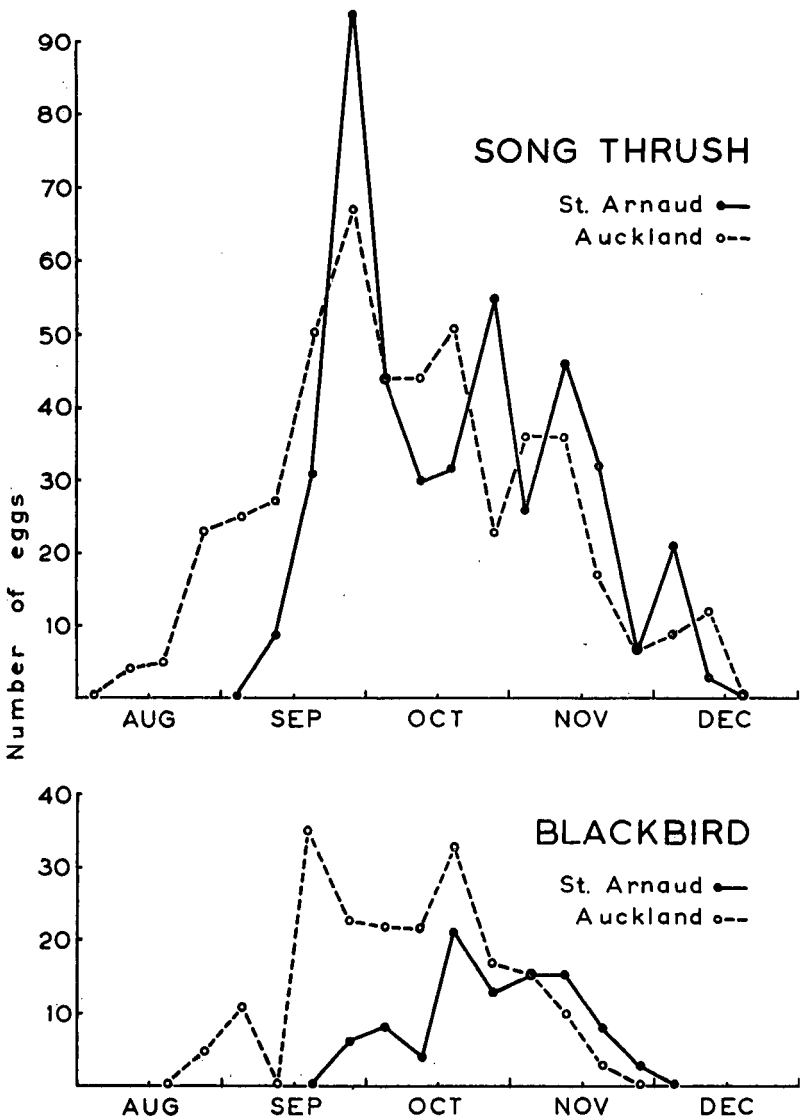


Fig. 2 — Comparison of breeding season of Song Thrush and Blackbird at St. Arnaud and Auckland (Bull, 1946). Bull also records nine eggs in June and July.

CLUTCH SIZE

Clutches were regarded as complete if visits sufficiently spaced showed no change in the number of eggs, or if the parent was definitely incubating for nests visited only once, following Snow (1955a). In addition a few clutches, known to have been incubated by breaking an egg, were included although deserted when found. The seasonal frequency distribution of clutch size (Table 4) shows no significant trend, and there were too few clutches to investigate annual differences.

TABLE 4 — Seasonal distribution of clutch size in 112 Song Thrush and 28 Blackbird nests

Clutch size	Song Thrush					Blackbird				
	2	3	4	5	Mean	2	3	4	Mean	
Sept.	---	3	26	3	4.00	2	2	---	3.0	
Oct.	---	2	5	27	3	3.83	7	6	3.46	
Nov.	---	4	3	19	1	3.63	2	1	9	3.58
Dec.	---	---	2	4	---	---	---	---	---	
Undated	---	---	1	8	1	---	---	1	---	
Total	---	6	14	84	8	3.84	2	10	16	3.50

The mean clutch sizes at St. Arnaud (Lat. 42°S) are similar to those of Thrushes (3.91) and Blackbirds (3.52) recorded by Bull (1946) at Auckland (Lat. 37°S); and Snow (1955a) found no change in clutch size of either species from north to south in Britain. The clutches of Thrushes (4.09) and Blackbirds (3.91) in southern England (Lat. 52°N) are larger than in New Zealand, however, and the birds here may have evolved a reduced clutch size with reduced latitude as found in Goldfinches in Australia (Frith, 1957). The predominance of four-egg clutches (73% at Auckland (Bull, 1946); 75% at St. Arnaud) is remarkable compared with the 57% in Southern England (Snow, 1955a). This might be due to the relative uniformity of the New Zealand habitats studied, or a lack of genetic variability.

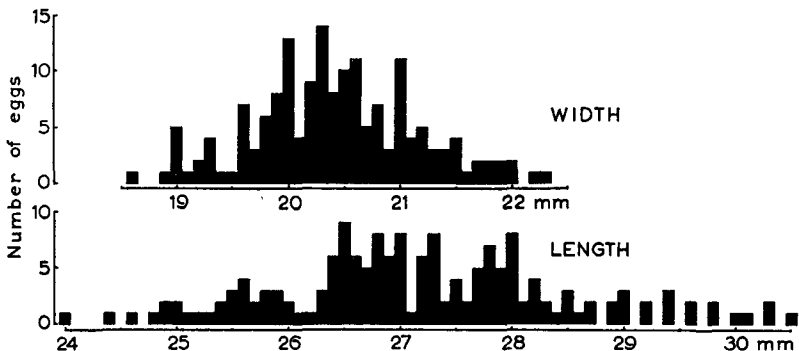


Fig. 3 — Dimensions of 165 Song Thrush eggs measured with vernier calipers to 0.1 mm. The length varies relatively more than the width.

EGG SIZE

The frequency distributions of length and width of 165 Thrush eggs from St. Arnaud measured throughout the 1965 breeding season are shown in Fig. 3. The average size (in mm) was 27.2 x 20.4, maxima 30.5 x 19.3 and 27.3 x 22.3; minima 24.0 x 19.6 and 25.9 x 18.6. British eggs seem a little larger: 28.4 x 20.9 (Kirkman, 1911); 28.7 x 20.9 (Kirkman and Jourdain, 1938); 27.6 x 20.9 (Witherby *et al.*, 1943).

BREEDING SUCCESS

As nests could not be visited regularly, various methods of estimating survival were used. The ultimate fate of 319 Thrush eggs was known: 45 (14%) survived to hatch and 21 (7%) fledged. The corresponding figures for Blackbirds were 42 eggs laid, 18 (43%) hatched and 7 (17%) fledged. Twenty-one Thrush and two Blackbird nests that were already deserted when found are included above, which could overestimate mortality because they last longer than successful ones and hence have a greater chance of being found. On the other hand, as Snow (1955b) points out, the inclusion of nests found with well grown chicks biases the estimate in the opposite direction because many nests fail completely in a far shorter time. A larger sample is made available for analysis by including with the above all nests with some information on either hatching or fledging success (Table 5).

TABLE 5 — Survival of Eggs or Chicks in Clutches whose fate was entirely or partly known.

Number of:	Song Thrush				Blackbird			
	1963	1964	1965	Total	1963	1964	1965	Total
Eggs laid	95	101	234	430	22	11	46	79
Eggs hatched	41	34	63	138	7	7	18	32
Eggs perhaps hatched but not fledged		8	9	17	11		15	26
Chicks fledged	4	7	10	21	7			7
Chicks last seen over half grown	22	8	17	47			4	4
Hatched and perhaps fledged	8	11	27	46		3	7	10

Assuming that chicks last seen half grown also fledged successfully (and any mortality in this group may be considered cancelled by successes in the final category of Table 4) the percentage of eggs laid which gave rise to fledged young was 16% for Thrushes and 14% for Blackbirds.

An independent method of assessing survival is to compare the number of nests containing eggs with the number containing chicks when first found. This avoids some of the previous difficulties since the incubation and fledging periods are similar and dead chicks may remain in a nest as long as deserted eggs. The number of Thrush nests containing chicks when first found was only 20 compared with 165 containing eggs, indicating a survival of 12%. The corresponding figures for Blackbirds are 29 nests with eggs, 5 with chicks; a survival of 17%. This method gives no measure of subsequent chick mortality before fledging.

Because of the infrequent visits to nests and the high total loss, partial loss was seldom recorded, and only three single eggs were known to have been lost from seven otherwise successful clutches. The causes of total nest loss are summarised in Table 6.

TABLE 6 — Causes of loss of 97 Song Thrush and 17 Blackbird nests

Number of nests with:	Song Thrush	Blackbird
Eggs deserted --- --- --- ---	49	4
Eggs broken --- --- --- ---	21	4
Eggs or chicks missing --- --- --- ---	5	4
Dead chicks --- --- --- ---	4	3
Nest upturned --- --- --- ---	6	1
Adult killed at nest --- --- --- ---	11	1
	—	—
Total nests --- --- --- ---	97	17

Of the desertions, at least 21 Thrush and 2 Blackbird nests were already deserted when found, and no desertions are known to have resulted from human interference. Eight Thrush nests were probably deserted because of the snowfall on 7 November 1964 (one bird was seen incubating with an inch of snow on its back), and three nests had matagouri spikes penetrating the lining; several other spiked nests were deserted before laying. Eleven adult Thrushes and one Blackbird were killed at the nest, probably by stoats (*Mustela erminea*). A stoat was watched dragging a whole Thrush nest containing one egg to its den on 23 September 1964. Opossums (*Trichosurus vulpecula*) were common and may have contributed to the upturned nests, broken eggs and desertions. Three Australasian Harriers (*Circus approximans*) were often seen over the area, and a pair nesting in 1965 brought at least one Thrush to feed the young. They probably destroyed few nests, however, because these were generally well protected from above by thorny matagouri. No other predators were implicated: rats and mice are rare, cats are absent, and the area is too remote for human interference.

DISCUSSION

The most outstanding feature of the St. Arnaud nests is their extremely poor survival. Gurr (1954) drew attention to the higher nesting mortality of Blackbirds in New Zealand compared with Britain, and concluded "The nests studied all seem to have been prone to interference from humans, and probably this contributed to their consistent lack of success." The St. Arnaud area is practically free from human interference, yet the survival estimates of 7% to 16% for Thrushes and 14% to 17% for Blackbirds are lower than recorded by Bull (1946) at Auckland (22% and 30% respectively), and far lower than Snow's (1955b) estimates for Britain (29% to 47% and 33% to 42% respectively).

Some of the difference could be due to sampling bias or different methods of analysis. The New Zealand studies so far have been detailed and have covered small areas. It is possible that more failed nests are recorded in such conditions, as there may be a tendency amongst casual recorders to ignore deserted nests and reserve cards for those with a more interesting history. A detailed study of Blackbirds

at Oxford, however, revealed that far more nests survived in the town (50%) than in the neighbouring Wytham woods (14%) where predation by both bird and mammal predators was heavier (Snow, 1958).

Thrushes and Blackbirds in New Zealand face fewer species of predators than those in Britain; but this cuts both ways, and the predators may have fewer alternative foods. The main predators at St. Arnaud were stoats which probably hunt for nests by sight. This would make the nests in open matagouri especially vulnerable, although there was no indication that the few Thrush nests found high in beech trees fared any better. Certainly some nests must have more success, unless adult mortality is very low, for both species are abundant on the area and appear to be maintaining their numbers.

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SHORT NOTE

THE EGG OF THE LONG-TAILED CUCKOO

It is widely believed (Oliver, 1955, and Cunningham, N.Z.B.N. 3, 176, 1949) that Fulton was the first to describe the egg of the Long-tailed Cuckoo (*Eudynamis taitensis*) (Trans. N.Z. Inst., xxxvi, 1904). It is therefore of some interest that a rough description of the egg was given by Edward P. Ramsay in 1865 (On the Nests and Eggs of some New Zealand Birds, *Ibis* New Series April 1865, 1.2: 155). The following is a direct quotation from this.

The "Mocker" (*Anthornis melanura*) is frequently the foster parent of the Long-tailed Cuckoo (*Eudynamis taitensis*, G. R. Gray, *loc.cit.* p. 231) ("List of the Birds of New Zealand," contained in a former volume of the 'Ibis' (1862, pp. 214-253)). Of this latter bird, the eggs which Mr. Huntley sends — one from the nest of *Anthornis melanura*, and another from that of the Fan-tail Fly-catcher (*Rhipidura flabellifera*) — are of a pale yellowish salmon-colour, freckled indistinctly with marks of a deeper hue: they are 10 lines long by 7½ lines broad.

— J. M. CUNNINGHAM

BIRDS OF SIMMONDS ISLANDS

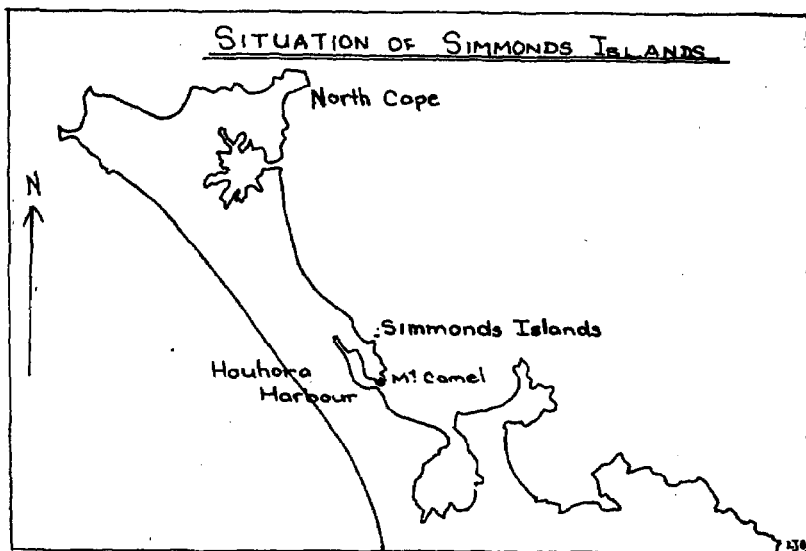
By LOIS J. WAGENER, Auckland Museum

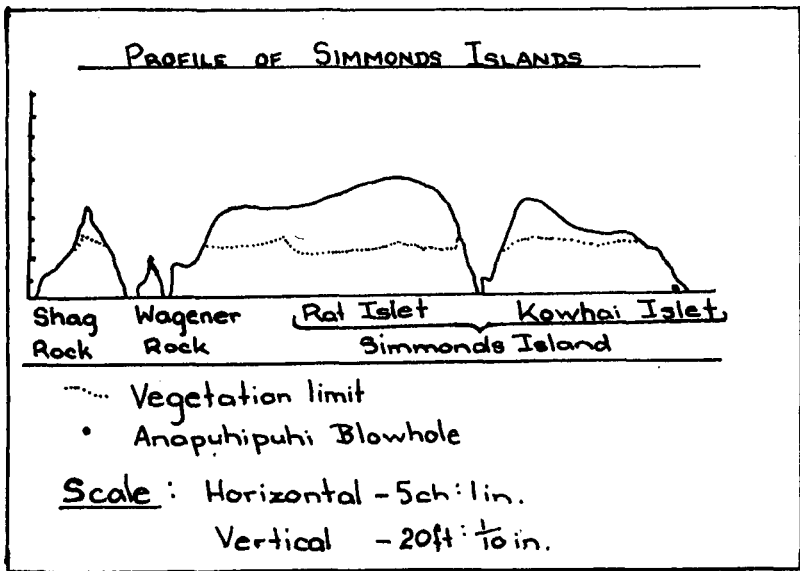
Simmonds Islands are situated half a mile from the mainland and four miles north of Houhora Harbour, Northland.

They were visited on the 6th and 7th December 1965, by Miss J. L. Fagan, the writer and Mr. Alan Wagener, the latter staying only one day. As no one had, as far as we know, previously visited the islands to study the bird life, the above mentioned visit was intended to list the birds, and carry out observations as far as possible. The party left from Mt. Camel, Houhora Harbour, and on our return trip we took the opportunity of briefly investigating the sea cliffs between the islands and Cape Perpendicular (north heads of Houhora Harbour).

The group is oriented in a N.W.-S.E. direction and consists of three rock stacks and two small islands. These islands are referred to in this paper as islets, because they are joined by a boulder beach; together they comprise Simmonds Island proper. To the west of Simmonds Island are two rock stacks, Wagener and Shag Rocks. A third rock, Hapuku Rock, is over a quarter of a mile north and here the water reaches a depth of over 25 fathoms.

Kowhai Islet is the easternmost islet of the group. It is three acres in extent and rises steeply to a narrow central ridge 50 to 75 feet above sea level, and 130 yards long. It is covered with low, wind-shorn scrub, in which flax, taupata, and *Astelia* are the dominant species. Little vegetation grows below the 50 foot contour except ice-plant, which is densest on the N.W. and W. slopes of the islet. Throughout the





vegetation burrows and tracks of the Little Blue Penguin occur. To the S.E. is the Anapuhipuhi Blowhole, which, even with calm seas, produces a spray rising 40 to 45 feet.

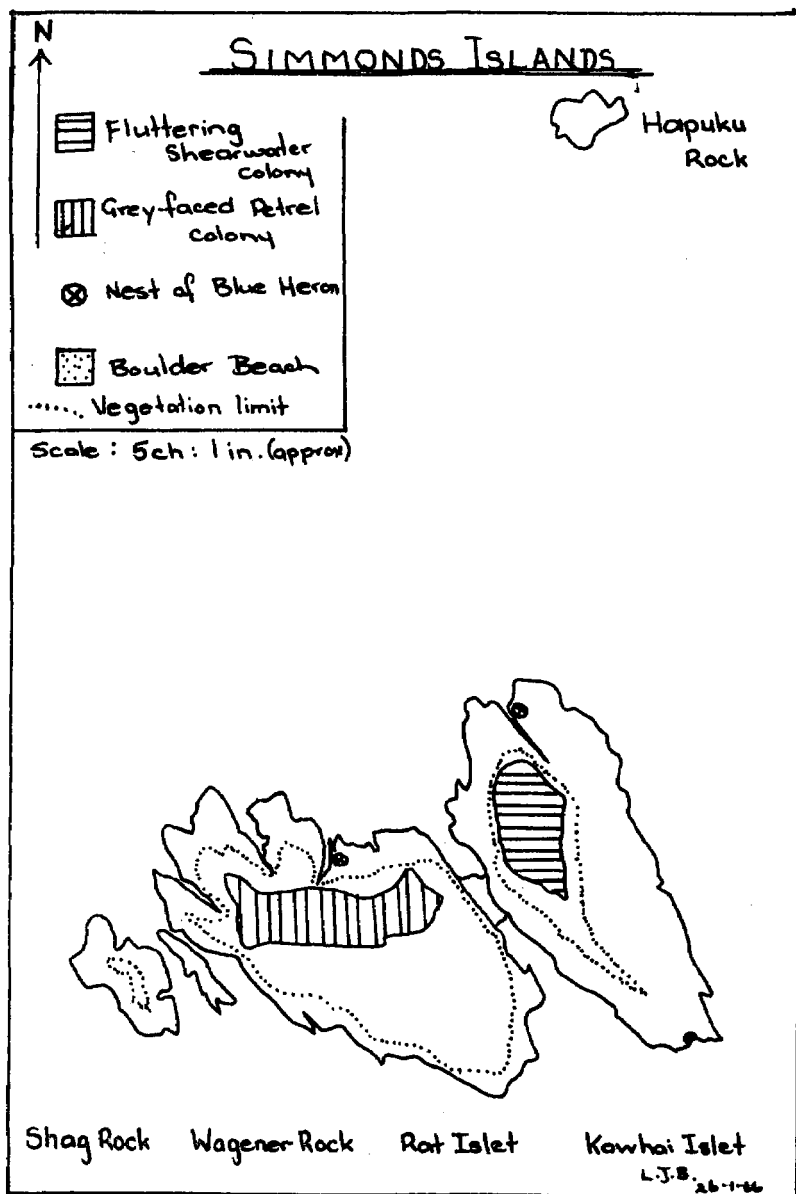
Rat Islet is almost dome-shaped, and is approximately four and a half acres in extent. It rises abruptly to form a plateau 200 yards long and varies between 55 and 130 yards in width. This slopes gently S.E.-N.W., the highest point being 120 feet above sea level. The plateau is covered in dense scrub, the dominant species being flax, taupata, *Hymenanthera*, *Astelia* and tawapou. On the top of the east cliff are several small pohutukawa trees, and on the highest part of the plateau cabbage trees appear, growing three to five feet above the vegetation cover. The vegetation is here, also, undermined by numerous penguin tracks and burrows.

Wagener Rock rises abruptly to a peak 45 feet above sea level. Small ledges on the northern face provide roosts for Pied Shags. The vegetation cover is predominantly taupata, ice-plant and pohutukawa.

The westernmost island of the group is Shag Rock which is almost vertical and rises to an apex 90 feet above sea level. About 70 feet above sea level there is a series of small ledges. The southern cliff is devoid of vegetation owing to the presence of Pied Shags. The remainder of the stack is unevenly covered above the level of 50 feet with vegetation very similar to that of Wagener Rock.

Hapuku Rock is 45 yards long and 25 yards wide, about $\frac{1}{8}$ acre in extent, and is completely bare of vegetation. It rises 20 to 30 feet above the water and is often covered during high seas.

Skinks are present on both Rat and Kowhai Islets in large numbers. One brown gecko was seen on Rat Islet.



The sea surrounding the group is deep and rich in fish. While we were on the island many large schools of fish were seen especially at sunrise and sunset. On the return trip Miss Fagan and the writer were taken by Mr. Freddy Blucher, a local fisherman, around the islands. One large school of maomao and one of kahawai were observed; the latter were being 'worked' by Gannets and White-fronted Terns.

The islands were known by the Maori as 'Motukiore' (meaning "Island of Rats.") Today the local people refer to the islands as the "Rat Islands." The writer, however, found no evidence of rats, either Maori (*Rattus exulans*) or introduced (*R. rattus* and *R. norvegicus*).

Mutton-birding appears to have been carried out, to a small extent, during the time of Maori settlement on Mt. Camel. Since then the birds appear to have remained untouched.

The ornithology of this island group is of much interest and at least one of the species found breeding in considerable numbers on the islands is found elsewhere in the far north only as individual pairs or small colonies (Little Blue Penguin). The following tables show the approximate numbers of bush and sea birds breeding on the islands.

Species	Rat Islet	Kowhai Islet
Starlings	35+ pairs	30+ pairs
Silverye	6 pairs	2 pairs
Grey Warbler	4 pairs	3 pairs
Dunnock	1 pair	-

Species	Rat Islet	Kowhai Islet	Rock Stack
Little Blue Penguin	75+ pairs	50 pairs	5 pairs
Grey-faced Petrel	35+ pairs	-	-
Fluttering Shearwater	-	15+ pairs	-
Pied Shag	-	-	9+ pairs
Blue Heron	1 pair	1 pair	-

LITTLE BLUE PENGUIN

Nesting in large numbers on both islets and on Shag Rock. The greatest concentration of burrows is just below the 50 foot contour on the northern cliffs of Rat Islet. A large fissure in the rock provides numerous places for breeding. The guano below varies from $\frac{1}{8}$ inch to $\frac{1}{2}$ inch in depth. The characteristic penguin smell was always present. Newly laid eggs and partly fledged chicks were found side by side in the fissure. Burrows were found on all parts of the islet.

On Kowhai Islet the burrows are most concentrated on the north-western and western portions of the island. Both newly laid eggs and almost fully fledged chicks were found. A well defined track zig-zagged its way through the ice plant, up the almost vertical cliff to the central ridge where burrows were most dense. Owing to the thick nature of the scrub it was difficult to establish the density of burrows per hundred square yards. However, after careful investigation of the area an estimate of 30 was reached. On both islands burrows containing eggs and chicks were found in sheltered places on the cliffs.

During the day many vacant burrows were found, most of the birds apparently having finished nesting. One egg was collected from

a deserted nest located about 20 feet above sea level and is in the Auckland Museum collection (Av 124.59). The second egg of the clutch was broken.

A bright night and a full moon may have accounted for the comparatively small numbers of birds heard coming in shore.

FLUTTERING SHEARWATER

Fifteen burrows were found on north and north west faces of the Kowhai Islet. The burrows were either partly cleaned out or occupied. No birds were found in the burrows during the day; two birds were heard calling at 9.30 p.m. on the evening of the 6th. White and dark feathers were found.

GREY-FACED PETREL

Between 35 and 40 burrows were found on the north and north west slopes of Rat Islet. None of the burrows was occupied at the time of the visit. A damaged egg was found and is in the Auckland Museum collection (Av 147.56).

GANNET

During the day small flocks of five to ten birds were fishing around the island. At dusk approximately 20 roosted on the north east portion of Hapuku Rock.

BLACK SHAG

One bird was roosting on Wagener Rock, and three were fishing in the surrounding waters. These birds did not settle on the stacks but flew north to the mainland.

PIED SHAGS

28 birds were sitting on the south and south west cliffs of Shag Rock. Nine occupied nests contained young apparently at all stages of development and two young birds were fishing in the small inlet between the two stacks. Birds were seen arriving and leaving the stack frequently.

Five birds were roosting on Wagener Rock, but there was no evidence of nests.

Mr. Blucher reports that the stacks are used on occasions as a roost by very large numbers of shags. At these times, Mr. Blucher says, the rock is almost completely covered by birds. Many birds were seen fishing in the surrounding waters, but did not appear to have any association with the stacks.

BLUE HERON

Individual birds were sitting on both islets. A nest containing two eggs, almost ready to hatch, was found in a rocky crevice on the north slope of Kowhai Islet. Both parents left the nest as soon as unfamiliar noises were heard. A nest on Rat Islet was unoccupied at the time of the visit, but it was apparent that chicks had been reared and had since left the nest.

BLACK-BACKED GULL

Common; many seen on rocks around the island, and fishing in the surrounding waters.

RED-BILLED GULL

An uncommon bird at the time of the visit. Three were sitting on Hapuku Rock on the morning of the 7th.

WHITE-FRONTED TERN

Roosting in small numbers on Hapuku Rock. Flying in flocks up to 13 in number, between the two islets, and fishing in flocks up to 75 around the islands.

GREY WARBLER

Four pairs were seen just before dusk in the pohutukawa trees on Rat Islet. On Kowhai Islet at dusk three pair were noted feeding in the taupata not far from where the writer and Miss Fagan spent the night. Just after dawn Grey Warblers could be heard calling from one islet to another.

BLACKBIRD

The Blackbird appears to be only a visitor to the islands. One bird was heard calling at about 2 p.m. on the 6th, from Rat Islet. It was later frightened by the party, gave an alarm and flew in the direction of the mainland.

DUNNOCK

One pair was nesting in very dense taupata in the north of the central plateau of Rat Island. Just before dusk the male and female birds were communicating with one another from flax bushes above the cliffs. About 9 a.m. the following morning both birds were seen feeding on the ridge of Kowhai Islet.

SILVEREYE

The islands support eight pairs of Silvereye, six of which were frequently seen together in the clump of pohutukawa trees on Rat Islet. The other two pairs remained confined largely to the taupata *Astelia* and flax on Kowhai Islet. A nest from the previous season (1964-1965) was taken from the plateau of Rat Islet. It is in the Auckland Museum collection (Av 34.51).

The Silvereye was the last passerine to be heard calling at dusk, and was the second to be heard at dawn.

CHAFFINCH

One male was flying among the vegetation on the Rat Islet plateau. It was later disturbed and left the islands for the mainland. There was no sign of this species breeding on the islands, but large numbers inhabit the adjacent mainland.

STARLING

The most common passerine of the islands (see tables). At the time of our visit the birds were breeding in rock crevices and ledges and on the bare ground under the vegetation. In most of the crevices and on the sheltered ledges the birds had made no attempt to construct any kind of nest, but had laid on the bare rock or weathered material. However, all the nests found under the vegetation were made from grass and small twigs.

Partially-incubated eggs and down-covered chicks were found together in the same crevice. Most of the eggs had hatched and the majority of the chicks were partly covered in ash-grey down.

Movement from the islands to the mainland usually took place in flocks varying from 15 to 40 in number. Small flocks left the island at about 6 a.m. and larger flocks returned between 6 p.m. and 6.30 p.m. The returning birds would circle the island four or five times before landing. Individual birds did not appear to move between the mainland and the islands in any great numbers.

The birds nesting on the Kowhai Islet returned to roost earlier than those on Rat Islet and became quieter about 20 minutes before the latter.

BIRDS SEEN AT SEA BETWEEN HOUHORA HARBOUR AND SIMMONDS ISLANDS

LITTLE BLUE PENGUIN

Two penguins were seen about three quarters of a mile from the mainland. The first was off Farmers' Point and the second off the Kowhai Headland.

BULLERS SHEARWATER

Five birds were seen on the 6th flying south half a mile off Farmers Point.

GANNET

Small flocks of up to ten birds were seen fishing up and down the coast on both trips. On the return trip approximately 40 birds were fishing at the entrance to Houhora Harbour.

BLACK SHAG

Four were noticed drying their wings in Houhora Bay on the return trip and two were fishing in the water just off Cape Perpendicular.

PIED SHAG

On the 6th, between Cape Perpendicular and the islands, 19 birds were fishing up the coast. On the return trip over 40 different birds were fishing or sitting on the rocks around the coast.

BLUE HERON

South of Farmers Point two birds were seen flying along the coast on the 22nd of December. Mr. Alan Wagener and the writer investigated the cliffs around this area and found two nests, both of which contained fledged chicks.

BLACK-BACKED GULL

Numerous birds were seen on both trips. The birds were also seen fishing in large flocks with the White-fronted Terns.

WHITE-FRONTED TERN

Small flocks were seen on both trips fishing out at sea. On the return trip approximately 120 birds were fishing with the Gannets at the entrance to the Harbour.

ACKNOWLEDGEMENTS

The writer is indebted to:

Miss J. L. Fagan for accompanying me to the islands.

Mr. Alan Wagener for the time and trouble he went to to transport us to the islands, and information given regarding the islands.

Also to Mr. and Mrs. R. D. Wagener for the loan of their dinghy and outboard motor, and the hospitality given during our stay in the area; and Mr. Freddy Blucher, for providing transport for our return trip and for information concerning the islands.

Thanks are also due to Miss J. H. Goulding, Herbarium Assistant, Auckland Museum, for identification of plant material collected during the visit.

I am grateful to Mr. E. G. Turbott, Director, Auckland Museum, for making the trip possible and for kindly reading the manuscript.

NOTES ON THE BIRDS OF TUTUILA, AMERICAN SAMOA

By *ROGER B. CLAPP and FRED C. SIBLEY*

Paper number 10, Pacific Ocean Biological Survey Program, U.S. National Museum,
Washington, D.C.

Very little information has been published on the present status, numbers and habits of Tutuilan birds. Ashmole (1963) published a compendium on the birds of the Samoan Islands based primarily on literature sources and on specimens in the Bernice P. Bishop Museum, Honolulu. Her paper and two short annotated lists (Keith, 1957, and Dunmire, 1960), comprise all recent publications that present information on the birds of Tutuila. The purpose of this paper is to present supplementary observations made by members of the Smithsonian Pacific Ocean Biological Survey Program from 1963-1965.

Smithsonian field parties visited Tutuila six times from 1963 to 1965: November 8-12, 1963, March 6-10, 1964, July 3-6, 1964, October 28-November 1, 1964, February 21-25, 1965, and June 6-10, 1965. Although our primary purpose in visiting Tutuila was not bird study, we made many incidental observations and collected 49 specimens, most of them landbirds.

Our observations did not cover all parts of Tutuila, and some areas were visited much more frequently than others. We made observations at Pago Pago International Airport and along the coast road running west from Pago Pago to the airport on almost all visits. On most visits we walked the dirt road from the west end of Pago Pago Harbour up to the ridge over which the road passes toward the village of Fagasa. The east end of the island, and the mountain ride to the north of Pago Pago Harbor, the reservoir about a mile southwest of Pago Pago, and the west end of Tutuila were visited less frequently.

The airport area and coast road and the pass to the windward side are perhaps the two most rewarding locations for the bird watcher. At the airport, Banded Rails are both common and tame, and a great variety of small landbirds, including the Cardinal Honeyeater, White-collared Kingfisher, and Wattled Honeyeater may be seen here in scattered patches of forest. Among the species which may be seen with relative ease along the coast road are the White-collared Kingfisher, Wattled Honeyeater, Reef Heron, and various species of shorebirds.

Intersecting the pass an uncompleted road follows the ridge of Fatifati Mountain to the north. From this road swiftlets, kingfishers, honeyeaters, both starlings, and other species may be easily observed. The Purple Swamphen may also be found in this area. On almost every visit a small number of large fruit bats were seen flying from ridge to ridge or roosting in large trees along the road.

The reservoir, about a mile south of Pago Pago and near the base of Palapalaloo Mountain, may be visited by following a path from Pago Pago which ascends and crosses the ridge of Matai Mountain. The path up the ridge is very steep but is fairly level and is partially paved from the top of the ridge to the reservoir. A walk along this path provides the best opportunity for close looks at landbirds, particularly the two fruit doves.

Our observations on the birds are given in two annotated lists below; the first gives our observations on migrants and resident landbirds; the second, our observations on the seabirds. An account is given under each species of the number of specimens collected and of such data on gonad development and stomach contents as may be relevant.

We wish to express our thanks to other members of the Pacific Program who allowed us to use their field notes, particularly Lawrence N. Huber and C. Douglas Hackman; and to acknowledge our indebtedness to Dr. Philip S. Humphrey, who allowed us time from our other duties so that we might make these observations.

PART I — NOTES ON THE MIGRANTS AND LANDBIRDS

GOLDEN PLOVER (*Pluvialis dominica*)

Few Golden Plovers were seen on any visit to Tutuila. We recorded 5 to 10 birds in Pago Pago harbor in November 1963; 15 to 20 near the airport in July 1964; and 3 on the windward shore near the village of Masausi on October 29, 1964.

RUDDY TURNSTONE (*Arenaria interpres*)

We recorded this shorebird less frequently than either of the other common shorebirds, the Wandering Tattler and Golden Plover. Four were seen on November 10, 1964, near the airport, and a small flock was present there in July 1964.

Although this common Central Pacific shorebird must have been seen in the past by other observers on Tutuila, we have been able to find no published record of its occurrence there.

BRISTLE-THIGHED CURLEW (*Numenius tahitiensis*)

Only a single Bristle-thighed Curlew was seen during our visits to Tutuila. On November 10, 1963, a single individual was seen in an open field near the airport. It has not been previously recorded from Tutuila and is presumably a relatively uncommon migrant.

WANDERING TATTLER (*Heteroscelus incanus*)

Wandering Tattlers have been seen with relatively greater frequency than any other shorebird species on Tutuila. They were usually found feeding along the rocky shoreline, either singly or in pairs. In November 1963 one was seen at about 800 feet on the ridge west of Pago Pago, feeding along a fast-flowing mountain stream.

REEF HERON (*Egretta sacra*)

Reef Herons were seen on almost every visit but were most abundant in July 1964 and February 1965, when small roosts were found on Futi Rock, a small island just southwest of the mouth of Pago Pago Harbor. On July 3, 1964, about 10 herons roosted on this island; in February 1965 about 15 roosted there, one of which was collected on February 24 (USNM 494401).

Smaller numbers were seen on other visits. On November 10, 1963, 4 Reef Herons were seen feeding in the rocky shallows near the coast road that leads from Pago Pago to the airport; on October 29, 1964, 2 were seen on a small peninsula near the road east from Pago Pago, and a few others were seen along the runway at the airport and in Pago Pago harbor. All of these birds have been dark-plumage morphs.

BANDED RAIL (*Rallus philippensis*)

Banded Rails were seen on each visit, often at lower levels but frequently well on the mountainsides. They were abundant in the vicinity of the airport where 7 or 8 rails could be seen in a few hours. The Banded Rails in this area are extremely tame and may be seen walking around parked vehicles much like domestic poultry. They are much more common on Tutuila than the Purple Swanphen. A single female (USNM 493500) collected on March 8, 1964, had an ovary 13 mm. long.

PURPLE SWAMPHEN (*Porphyrio porphyrio*)

Despite Ashmole's statement that Purple Swanphens are "a very common bird found on all the [Samoan] islands," we saw this bird rather infrequently. On November 10, 1963, a single bird was flushed out of dense vegetation at about 1000 feet on the north side of Palapalalao Mountain. We saw another on July 5, 1964, on the near side of this pass above Fagasa and several more on the ridge southeast of Fatifati Mountain in June 1965.

Native informants state that Purple Swanphens frequently perch in banana trees and feed on the ripe bananas.

CRIMSON-CROWNED FRUIT DOVE (*Ptilinopus porphyraceus*)

The fruit pigeons were common in forested areas on Tutuila but were difficult to observe since their plumage blended exceptionally well with the foliage. Nearly all fruit pigeons seen and identified were of this species, which is perhaps from 20 to 30 times as numerous on Tutuila as the Many-colored Fruit Dove.

A single specimen (USNM 495761) was taken June 7, 1965, in the reservoir valley. This bird had enlarged testes (13mm.) and weighed 108.6 grams.

MANY-COLORED FRUIT DOVE (*Ptilinopus perousii*)

A single specimen (USNM 495762) collected June 7, 1965, on the south flank of Palapalalao Mountain, and another bird seen there the same day constitute the only Pacific Program records of this species on Tutuila. The specimen had enlarged testes (13 mm.) and weighed 108.6 grams.

PACIFIC PIGEON (*Ducula pacifica*)

On most of our visits we saw no Pacific Pigeons. Before the June 1965 visit we had seen Pacific Pigeons only once: a single bird observed flying over Fatifati Mountain on July 5, 1964. In June 1965 Huber saw at least 20 of these birds, often flying singly from ridge to ridge. We have never seen large flocks such as those described by Ashmole (1963). On this same visit, Huber met a group of hunters who had shot three pigeons. It is likely that the low Pacific Pigeon population is caused by hunting pressure.

LONG-TAILED CUCKOO (*Urodynamis taiitensis*)

This species was seen only infrequently by Pacific Program personnel and is apparently not very numerous on Tutuila. On November 9, 1963, we saw a single bird flying between Palapalalao Mountain and the ridge west of Utumoa Stream. Two more were seen the following October on the ridge between Filiae and Leano Mountains on the east end of the island. One of these, an adult male (USNM 493949), was collected on October 30, 1964. Another cuckoo, an immature male (USNM 495734), was collected on June 8, 1965, as it sat in a densely leaved tree on the side of Fatifati Mountain.

The adult male's stomach contained two locusts and crab and fish remains, indicating that the bird had been feeding along the shore. (Native informants state that these cuckoos are often terrestrial and are frequently seen walking along dirt roads). The weight of the adult was 135.3 grams, that of the immature, 90.1 grams.

BARN OWL (*Tyto alba*)

On October 30, 1964, we were given a specimen that had been killed about a week before. Agricultural entomologist Neal Spencer obtained the specimen from a native hunter who had shot it for food. The specimen, a female, (USNM 493942) was not in breeding condition (ovary: 5mm.).

WHITE-RUMPED SWIFTLET (*Collocalia spodiopygia*)

Swiftlets were seen frequently on each visit to Tutuila, and they were particularly abundant along the cliff faces on the ridge west of Pago Pago. On November 9, we saw several hundred swiftlets in this area, but on March 7, 1964, they were much less numerous, perhaps 50 in all being sighted.

We watched as they sailed by on slightly downbent wings, flapping much less than the North American Chimney Swift (*Chaetura pelagica*). For the most part they were silent, but occasionally they gave high-pitched "twi-tweet" notes.

A single specimen a male (USNM 493502) collected March 7, 1964, showed no sign of gonad enlargement (testes: 2mm).

WHITE-COLLARED KINGFISHER (*Halycon chloris*)

We have seen Kingfishers on each visit, and they are probably more numerous than our observations would indicate. Secretive and inconspicuous, they are usually noticed only in flight or on exposed perches. On November 8, 1963, we saw 6 to 8 birds perching on telephone wires along the coast road from Pago Pago to the airport. Similar numbers have been seen on each visit.

On March 7, 1964, the senior author found a nest with young near the top of a 40 foot high mud bank on the ridge crest west of Pago Pago. Although we could not reach the nest, the chorus of harsh notes given by the young and their presence at the burrow entrance indicated that they were well grown. Their calls, a series of buzzy, rasping, "a-a-a-h" notes, easily audible more than 50 yards from the nest, continued incessantly — even when the adult birds were not present. A green lizard 2 inches long and a large green insect resembling a katydid were among the food items brought to the young, which were fed by both adults.

Five specimens were collected, two on March 7, 1964 (USNM 493484, 493485); two on March 8, 1964 (USNM 493482, 493483), and one on June 8, 1965 (USNM 495759). None had enlarged gonads.

Two green katydids and the head parts of a large beetle were found in the stomach contents of one specimen (USNM 493483).

RED-VENTED BULBUL (*Pycnonotus cafer*)

Keith (1957) recently reported that this species was common on Upolu, where it was presumably introduced (Ashmole, 1963). When we first visited Tutuila on November 8, 1963, from 3 to 5 of these bulbuls were seen in the tops of the palms and on the telephone wires in the centre of Pago Pago. In June 1965, the Red-vented Bulbul was numerous in Pago Pago, and several individuals were seen in the

hills bordering Vaitapo Valley south of the town. This suggests that Red-vented Bulbuls eventually may be found throughout the island.

This species has not been previously recorded from Tutuila and presumably was introduced sometime after 1957. (Dunnire visited the island in 1960 but confined his observations to the coast road northwest of Pago Pago).

MAO (*Gymnomyza samoenia*)

Despite prolonged searches on several visits, Maos were neither seen nor heard by Pacific Program personnel. At present Maos are either very rare on Tutuila or have been exterminated from the island.

WATTLED HONEY-EATER (*Foulechio carunculata*)

This very common Samoan species was the most conspicuous land bird, often found in noisy flocks of 8 to 10 birds in brushy second growth. As many as 40 or 50 were seen in the course of a single day's observations. Eleven specimens were collected, 7 on March 7 and 8, 1964 (USNM 493486-493492), 3 on October 29 and 30, 1964, and 1 on June 7, 1965 (USNM 495760). None of these birds had enlarged gonads.

CARDINAL HONEYEATER (*Myzomela cardinalis*)

On each visit Cardinal Honeyeaters were regularly seen in small numbers at the lower elevations, although they were more numerous at the upper elevations, particularly near the tops of Matafao Peak, where they were usually the only landbirds seen. They were common also in the vicinity of the airport, where about 15 were seen on November 10, 1963.

Ashmole (1963) stated: "Apparently there are many more males than females seen." At lower elevations our observations corroborate her statement, but we found that near the mountaintops females and immatures outnumbered males 4 or 5 to 1.

An adult male (USNM 493501) was collected on March 8, 1964, and another adult male (USNM 495758) was collected on June 8, 1965. Neither had enlarged testes, and the latter specimen was in heavy molt.

POLYNESIAN STARLING (*Aplonis tabuensis*)

This starling is decidedly less common on Tutuila than its congener, the Samoan Starling. While small numbers of Polynesian Starlings have been seen on every visit, the Samoan Starling is about 50 times as numerous.

Two specimens were collected on March 8, 1964. One of these, a female (USNM 493499), had an enlarged ovary (10 mm.), the other, a male (USNM 493498), had small testes (3 mm.).

SAMOAN STARLING (*Aplonis atrifuscus*)

Samoan Starlings commonly were seen everywhere from sea level up into the mountain forest. It is a noisy and conspicuous species.

Eleven specimens, 9 of them males, were collected, 5 in March 1964, 3 in October 1964, and 3 in June 1965 (USNM 493493-493497, 498059-498061, 495755-495757). Gonads were neither fully developed in March (testis: 4-8 mm. in 3 birds), nor in October (testes: 6-8 mm. in 3 birds). Two of 3 males collected in June, however, had 11 mm. testes, suggesting a summer breeding season. Weights of the 3 October males were 132.3, 147.5, and 158.5 grams, while the 3 June males weighed 144.0, 135.5, and 151.0 grams.

PART II — NOTES ON THE SEABIRDS

On three departures from Tutuila we made counts of all birds seen on our cruise track from the mouth of Pago Pago harbor for a distance of 10 miles. The numerical results of these counts are given in the table below. The annotated species list following the table contains observations made both on the island and offshore.

TABLE 1 — Numbers of Birds Seen Offshore Tutuila, American Samoa
Dates and Periods of Observation

Species	Mar. 10, 1964 (0930-1030)	Nov. 1, 1964* (1100-1130)	June 10, 1965 (0930-1040)
Wedge-tailed Shearwater	1	—	—
Unidentified Shearwaters	7	—	—
Phoenix Island Petrel?	—	—	1
White-tailed Tropicbird	—	—	1
Red-footed Booby	2	—	7
Brown Booby	7	—	3
Common Noddy	63	84	42
Fairy Tern	6	15	100**

* Includes observations for only the first five miles.

** During this count Fairy Terns were too numerous for accurate enumeration. The figure given in the table merely represents the order of magnitude.

ANNOTATED LIST

WEDGE-TAILED SHEARWATER (*Puffinus pacificus*)

This species was most abundant off Tutuila during the winter months. In addition to the bird listed above, we saw a single bird offshore on November 8, 1963, about 15 Wedge-tailed Shearwaters on February 21, 1965, and nearly as many on February 25 when we left Pago Pago. Most of these birds were the dark-plumage morph.

AUDUBON'S SHEARWATER (*Puffinus lherminieri*)

Hackman saw a single Audubon's Shearwater about one mile offshore on February 21, 1965.

PHOENIX ISLAND PETREL (*Pterodroma alba*)

A bird tentatively identified as a Phoenix Island Petrel was seen March 10, 1964, about 10 miles offshore. Since this species is difficult to distinguish, at sea, from the Tahitian Petrel (*Pterodroma rostrata*) we feel that a more positive identification is untenable, unless corroborated by a specimen.

WHITE-TAILED TROPICBIRD (*Phaethon lepturus*)

We saw only a small number of White-tailed Tropicbirds in Pago Pago harbor or close offshore. They were far more numerous in the hills behind Pago Pago, where 8 to 10 birds were often in sight at one time. Larger numbers were present there on visits in March, June, and July than on visits in October, November, and February. Two specimens (USNM 495683, 495684), both females, were collected on June 8, 1965. One (495684) had enlarged gonads (largest ovum 5 mm.). The weights of the birds were 295 and 277 grams.

RED-FOOTED BOOBY (*Sula sula*)

We saw small numbers, usually from 3 to 10 birds, on every visit, either from the shore near the east end of the island or outside the harbor during our arrivals and departures. We saw the largest number of Red-footed Boobies on February 21, 1965, when a flock of 45 was seen several miles offshore.

BROWN BOOBY (*Sula leucogaster*)

Small numbers of this species were seen on most visits, either offshore the east end of the island or near the harbor mouth. Brown Boobies usually were seen closer to shore than Red-footed Boobies.

In addition to those birds noted in Table 1 above, we saw 2 Brown Boobies as we approached the harbor mouth on November 8, 1963; 1 at the harbor mouth on March 6, 1964; and about 5 to 10 off the east side of Tutuila in March 1964.

GREAT FRIGATEBIRD (*Fregata minor*)

A few of these birds were seen on 3 of our visits. We saw 2 birds, a male and a female, over Futi Rock on November 10, 1963; another on March 9, 1964, at the east end of Tutuila offshore Folau Point; and 3 more over Pago Pago harbor on February 24, 1965.

LESSER FRIGATEBIRD (*Fregata ariel*)

On November 10, 1963, we saw an adult male and an adult female over Futi Rock. The distinctive white flank markings of the male and the sharp delineation between breast and throat in the female were seen clearly. In addition, both birds were compared with 2 Great Frigatebirds seen simultaneously in the same area. On October 29, 1964, 2 adult males were seen on the windward side of the island. Although this species is not listed as occurring in Samoa by Ashmole (1963), an earlier paper noted that 2 Lesser Frigatebirds were seen along the coast road without giving further details (Dunmire, 1960).

COMMON NODDY (*Anous stolidus*)

The Common Noddy and the Fairy Tern were usually the two most numerous species offshore Pago Pago harbor. Common Noddies were frequently observed in feeding flocks with other species such as Fairy Terns, Brown Boobies, and Red-footed Boobies. Numbers of Common Noddies in such flocks include observations of about 30 birds on March 6, 1964; about 20 on March 10, 1964; about 80 on November 1, 1964; about 40 on June 7, 1964, and about 40 on June 10, 1965. These birds also frequented the forest hills behind Pago Pago and were often seen along the coast. In either area, 8 to 10 individuals were in sight at one time.

On October 29, 1964, several Common Noddies persistently dived on Pacific Project personnel, suggesting the presence of nesting activity. On this visit Huber found on the windward side of the island near Cape Larsen a colony of about 200 Common Noddies nesting in tall trees that grew up a cliff at an 80° angle to the water. On June 6, 1965, Huber saw a nestling Common Noddy almost ready to fledge.

HAWAIIAN NODDY (*Anous minutus*)

We saw 2 Hawaiian Noddies in a flock of feeding Fairy Terns on March 6, 1964. This single observation, when compared with our numerous observations of Common Noddies, indicates that this species is the less common by far of the two noddies on Tutuila.

FAIRY TERN (*Gygis alba*)

We saw Fairy Terns on each visit to Tutuila. They were usually most abundant in the forested hills behind Pago Pago where (as in November, 1963) as many as 10 birds were in sight at one time. The largest numbers were seen in June, 1965, when at least 100 were observed just outside the harbor. (Peculiarly, Fairy Terns had been much less abundant the preceding July 1964, when relatively few birds were seen either offshore or in the hills). Three specimens were collected. One, a female (USNM 494412), collected at Futi Rock, February 24, 1965, had partially enlarged gonads (lg. ovum 2 mm.). The other two, a female and a male (USNM 495597, 495598) collected June 8, 1965, had partially enlarged gonads (lg. ovum: 3 mm; testes 6 mm.) and weighed 111 and 107 grams respectively.

BLUE-GRAY NODDY (*Procelsterna cerulea*)

These small terns were seen on every visit to Tutuila. A few were seen flying high up the mountainside in company with more numerous Fairy Terns and Common Noddies, although they were distinctly less frequent there than along the coastline and in the harbor.

On November 10, 1963, we saw 4 Blue-gray Noddies flying about Futi Rock near the mouth of Pago Pago harbor, and on the twelfth saw a flock of 25 or 30 birds in the same area. On March 6, 1964, about 40 were seen at the harbor mouth in a feeding flock composed of Common Noddies, Fairy Terns, and Brown Boobies. The following July small numbers were seen about Futi Rock. Others were seen flying high up on the mountain ridge on the east side of Tutuila. On October 29, 1964, when we again visited the east side of the island, the junior author found a nearly fledged nestling and several old nests on Malo Point, near the east end of Tutuila.

Five specimens, 3 females and 2 males (USNM 494496-494500), collected at Futi Rock, February 24, 1965, were not in breeding condition, judging from the size of the gonads. The 3 females weighed 45, 47, and 48 grams; the 2 males, 52 and 57 grams.

SUMMARY

Observations on 19 species of resident and migrant birds and on 12 species of seabirds are reported herein together with data on specimens. Breeding records are given for the White-collared Kingfisher, Common Noddy, and Blue-gray Noddy. Red-vented Bulbul, Bristle-thighed Curlew and Ruddy Turnstone are reported from Tutuila for the first time.

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AUSTRALIAN COOTS ON VIRGINIA LAKE, WANGANUI (SEPTEMBER 1962 TO MAY 1966)

By *ROSS MACDONALD*

This lake is situated within the Wanganui City boundary in a park area. Vegetation around the margins consists of willows, raupo and other rushes. Grass paths allow visitors to walk right round the lake edge. The usual waterbird population is made up of Grey and Mallard ducks, Mute Swans, occasional Shoveler, Black, Little Black, and Little River Shags.

- 1962 One adult Coot present between 29th September, when first recorded by W. J. Pengelly, and 10th November.
- 1963 One adult bird present between 29th Sept. and 20th Oct.
- 1964 One bird present from 30th May; two from 13th June (though after this date, the two were not always seen). This pair bred, the two adults with 6 young being observed first on 12th Dec.
- 1965 A third adult was noted on the lake on 15th Jan. and remained for some time, being recorded up to 19th April. The 6 young, first seen on 12th Dec., were reared successfully. Two further chicks were raised by the same adult pair so that the Coot population in April was 3 adults and 8 young. Between July and October no more than 8 birds were observed, though the possible total was 11. On 26th Dec. 2 adults with 8 young were observed; 4 other adults were also on the lake. Thus only 6 of the 11 Coots had remained on the lake.
- 1966 During Jan., 3 breeding pairs were noted. The 8 young (noted on 26th Dec.) were recorded through Jan. until the 25th Jan., when only 7 were noted from that day. The other two breeding pairs raised two young each. The total population therefore at the end of Jan. stood at 6 adults (3 breeding pairs) and 11 young — 17 birds. By the 27th April, the total population had been increased to 23 with two further broods of 4 and 2 young. The third breeding pair showed signs of having young but these could not be located. It would appear that the three breeding pairs raised 17 young during the 1965-66 breeding season.

SUMMARY

Year/ Breeding season	Adult birds	Breeding pairs	Young raised	Total after breeding season
1962	1			
1963	1			
1964-65	3	1	8	11
1965-66	6	3	17	23

GENERAL OBSERVATIONS

The breeding season on this lake has been from Dec. to April. Broods at the end of the season are smaller than earlier ones. The largest number hatched was 8, of which 7 were raised. A breeding pair usually has two clutches a season. Quite a considerable difference in size of young of the same brood has been noted. Each breeding pair have definite territories and the family group remains together some time after the young are feeding themselves. The larger chicks often shared waterweed with younger or smaller chicks.

Aggression is shown towards all other waterfowl.

THE BREEDING OF BLACK-BACKED GULLS IN THE SOUTH ISLAND MOUNTAINS

By *GRAEME CAUGHLEY*

Forest Research Institute, N.Z. Forest Service, Rotorua

Should you ask a musterer or mountaineer which bird he considers most characteristic of the South Island high country, his selection is unlikely to be either the Kea or the Rock Wren; in most cases he would choose the Black-backed Gull (*Larus dominicanus*). This bird, which is usually thought of as a shore and low-country species is ubiquitous in the mountains of the South Island, and in this region is more often encountered and has a greater altitudinal range than the birds usually thought of as high-country species.

The purpose of this note is to show that Black-backed Gulls breed in the mountains much more often than is generally believed. Oliver ("New Zealand Birds," 1955) summarized the known breeding range, and recorded nesting in the Rock and Pillar Range, in the Paparoa Range, and above Lake Wanaka. The additional breeding records given here are restricted to the Canterbury high country.

Waiau Drainage

5/1/63; Henry Valley: A Forest Service party reported two downy chicks in a tarn.

5/2/63: The writer inspected this permanent tarn, which is at an altitude of 5,150 feet and measures 50 x 20 yards. The two chicks were then in juvenile plumage but could not be put to flight. A pair of adults was in attendance.

22/1/63; Hope Valley, vicinity of Mt. Garfield: One very young downy chick was found at 5,375 feet on a tarn measuring 45 x 10 yards. The remains of an egg shell were found at the water's edge. Two adults, presumed to be the parents, wheeled and called overhead.

10/2/63; Waiau Valley, two miles down river from Caroline Stream; altitude 2,725 feet: Three juveniles and two adults were seen on the river bed. The juveniles flew well.

14/2/63; Lake Thompson (5,500 feet) at the true head of the Waiau: On this tarn measuring 400 x 300 yards was seen a juvenile bird of the year.

Waimakariri Drainage

Summer, 1962; Cox branch of the Poulter Valley: Two gulls' eggs were found in a stream bed above the timber line (R. Price, pers. comm.).

Summer, 1962; Nigger branch of the Esk Valley: A colony containing about 20 chicks was found on the riverbed (R. Price, pers. comm.).

Rangitata Drainage

Summer, 1961; Clyde Valley: Black-backed Gulls were nesting on the river bed (I. Maxwell, pers. comm.).

Waitaki Drainage

19/12/63; Godley Valley, Classen Glacial Lake (3,400 feet): 44 adults were counted near the outlet of the lake. The writer found two nests, one of which contained a newly hatched chick.

20/12/63: C. N. Challies checked the same area and found three empty nests and one containing two eggs. One chick was swimming on the lake (Challies, pers. comm.).

13/1/64: Macaulay Valley, above Tydall Downs (3,300 feet): Three juveniles were seen on the river bed, together with what was strongly suspected to be a recently occupied nest (I. Hamilton and W. Risk, pers. comm.).

The condition common to these observations is that the birds were nesting only in the vicinity of permanent water, whether it be tarn, glacial lake, river, or permanent stream. These records show that the breeding of Black-backed Gulls in the high country of Canterbury is a common occurrence. As the number of breeding records from each valley is in almost direct proportion to the amount of time the writer has spent there, it is probable that the total could be multiplied many times by additional field work. There is no reason for believing that the situation is unique to Canterbury. For instance, Mr. J. T. Holloway informs me that the frequency of breeding throughout high-country Otago, on the east of the divide at least, is much the same as in Canterbury. It can be confidently predicted that further investigation will show that this gull commonly breeds in most of the South Island mountains.

Because of the abundance of adult gulls in the mountains and the apparent frequency with which they breed there, the writer suggests that this region may contain a self-sustaining population which inter-breeds to only a limited degree with the coastal population. This hypothesis can be tested easily by banding.



WANGANUI LABOUR DAY WEEK-END FIELD STUDY 1965

Members met at Rutherford Intermediate School on Friday, 22nd October, 1965, to renew acquaintances and have supper while discussing forthcoming activities.

The weather treated us very fairly throughout the week-end.

Evening programmes consisted of: on Saturday, a slide showing of the Kermadec Expedition with commentary by John Peart and David Crockett and a Panel Discussion (Panel: A. Blackburn, H. R. McKenzie, A. T. Edgar) of questions raised by members. The Sunday evening programme was arranged in the Wanganui Museum, where members could view the collections, see a display of taxidermy arranged by Barry Tucker and discuss the week-end's observations.

Saturday, though fine, was very windy, with a south-westerly blowing in from the sea. This made observations difficult, particularly on Kaitoke Lake. Birds observed:

Waitotara River mouth and adjacent lagoon —

1 Black Shag, 9 Little Black Shag, 2 White-faced Heron, 27 Grey Duck, 11 Mallard, 2 Black Oystercatchers, 7 Banded Dotterel, 1 Bar-tailed Godwit, 5 Knot, 16 Pied Stilt, 50+ Black-backed Gull, 7 Pipit.

Marahou Lake —

20 Black Shag (+ a large colony not counted), 9 Little Black Shag, 15 White-throated Shag, 1 pr. Black Swan with 3 cygnets, 130+ Grey Duck and Mallard, 20+ Shoveler, 7 Pukeko.

Turakina River mouth —

2 Black Oystercatchers, 10 Bar-tailed Godwit, 1 Knot, 4 Pied Stilt.

Kaitoke Lake —

1 Dabchick, 50 Black Swan + 15 cygnets, Shoveler, Grey Duck and Mallard (number too difficult to determine under the conditions). It could be mentioned here that in June 1964, on this lake, 365 Shoveler (190 drakes) and 250 Greys and Mallards were observed on one day.

Virginia Lake —

5 Australian Coot, 1 Little Pied Shag, Grey Duck, Mallard and Mute Swan.

Sunday, a fine sunny day, provided members with an opportunity to drive up the Ohakune Mountain Road and enjoy the glorious views from the higher reaches. A survey was made of the bird life to be found in the beech forest approximately twenty minutes walking distance either side of the road (this distance varied according to the terrain). The following is a list of the species observed or heard. Each name is followed by the total number of it recorded and in brackets its approximate percentage of the total birds noted. They are listed in order of frequency recorded.

Grey Warbler 113 (31), Pied Tit 35 (9½), Chaffinch 34 (9½), Tui 33 (9), Rifleman 33 (9), Whitehead 25 (7), Waxeye 21 (6), Bellbird 14 (4), Blackbird 13 (3½), Pied Fantail 12 (3½), Parakeet 7 (2), Songthrush 5 (1½), Redpoll 4 (1), Greenfinch 3 (¾), Kingfisher 3 (¾), Kaka 3 (¾), Robin 2 (½), Dunnock 2 (½), N.Z. Falcon 2 (½), Native Pigeon 1 (¼).

Species noted at checkpoints from high to low levels were the Rifleman, Grey Warbler, Pied Tit, Pied Fantail, Blackbird, Song Thrush, Chaffinch and Waxeye. Whitehead, Bellbird and Redpoll were noted at a high level but the larger number of each were recorded at the lower levels.

The gathering dispersed on Monday after lunch at Bushy Park, the Royal Forest and Bird Protection Society Reserve, situated a few miles north of Wanganui. The following species were recorded by members who were returning home or "exploring" other areas in the district —

Wanganui River, rt. bank below Cobham Bridge: 7 Black Shag, 10 Little Black Shag, 4 Bar-tailed Godwit, 23 Pied Stilt (H. R. McKenzie).

Wanganui Wharves: 1 White-faced Heron, immature Red and Black-billed Gulls and adjacent to "Steelboats" 3 N.I. Pied Oystercatchers (1 black) (H.R.McK.).

Otorere Stream, Desert Road: Blue Duck (A. Cragg).

Wanganui members, who organised this week-end, thoroughly enjoyed doing so and trust all our visitors had an enjoyable and profitable ornithological week-end.

SHORT NOTES

ANOTHER NEW ZEALAND RECORD OF THE GLOSSY IBIS

On 7/5/66, the opening day of the duck-shooting season, Miss J. McKay, of Halkett, Canterbury, picked up on the flats at Lake Ellesmere, Canterbury, a Glossy Ibis (*Plegadis falcinellus*), which had been shot in the breast, and brought it to Canterbury Museum. The bird is an adult in winter plumage.

Unfortunately, through the blood dispersal caused by the shot, and the small size of the gonads in winter, the sex could not be determined, but a few measurements may be of interest. Bill, 12.6; Tarso-metatarsus, 10.2; Mid-toe, 8.2 c.m. These feet measurements are slightly longer than those given by Oliver (New Zealand Birds, 1955, 400). The wing spread is 101.5 c.m., the total length 37.5 c.m.

— R. J. SCARLETT



CATTLE EGRETS AT LAKE NGAROTO

From a report in the Weekly News it was learned that two "white herons" had been seen feeding among cattle on Mr. I. S. Macky's farm, at Lake Ngaroto.

This lake near Te Awamutu is typical of several others in the district, which has been visited by several White Herons and a White Ibis over the years. No white herons had been seen during the two previous years and when a party which included Mr. and Mrs. H. R. McKenzie, Mr. and H. R. Templer, Mr. G. Turbott and the writer, visited the Lake on 22/7/64 these two birds were identified by Mr. Turbott as Cattle Egrets (*Ardeola ibis*). Mr. Turbott was already familiar with this species as he had first identified Cattle Egrets in the South Island.

The two birds habitually fed among the cows as winter feed of chow mollier was fed to them and appeared to eat the pitch (H.R.McK.). When this supplementary fodder for the cattle was stopped, the birds moved to Mr. McFall's farm beside the Lake.

On 11/10/64 the two birds were beginning to assume breeding plumage and the colour of the head of one had changed to ginger with short pluming or ruffling on top of the head and upper hind neck. There was also ginger down the middle of the chest with dorsal ginger plumes down to tail. Legs were dark; bill a little less yellow; legs dark (H.R.McK.).

The two were still present on 23/10/64 and seemed about the same colour as when last seen; but could not be studied owing to disturbance by aerial topdressing.

During subsequent trips in November-December 1964 no further trace of these birds was seen, but it is interesting to note that five birds were observed near Levin on 28/10/64 also in varying degrees of breeding plumage.

— J. L. KENDRICK

A THIRD NORTH ISLAND RECORD OF THE BLACK-WINGED PETREL

On 23/3/63 the body of a small *Pterodroma* species of petrel was found on Foxton beach. Subsequent examination of literature (Fleming, 1954; Oliver, 1955) indicated that the specimen was a Black-winged Petrel (*Pterodroma hypoleuca nigripennis*) and this identification was confirmed by Dr. R. A. Falla when the specimen was presented to the Dominion Museum. (See also the 1963 Beach Patrol Report by B. W. Boeson in *Notornis* 12: 169-175.)

It was estimated that the bird had died about one week before discovery, the remains being dried but not bleached. The specimen consists of the entire skeleton with bill, feet and most of the plumage of head, wings and tail intact. Plumage details of wings and tail of this specimen are as described for a previous specimen (Fleming, 1954). Although many of the wing feathers close to the body have been lost, sufficient of the underwing coverts remain to show an underwing pattern closely resembling that shown in Fleming's sketch. Measurements are: Culmen, 24 mm.; tarsus, 32; mid-toe and claw, 37.5; wing, 221; tail, 98; length of skull, 63.

There are two previous records of the Black-winged Petrel from the North Island, both being from the Wellington area. The first is the aforementioned specimen collected at Waikanae beach on 20/3/54 (Fleming, 1954) and the second, presented fresh to the Dominion Museum in August, 1954, is from the Upper Hutt district (Falla, *in litt.* 4/4/63).

It is possible to speculate on the meteorological factors which may have caused this bird to be stranded on Foxton beach. A depression of tropical origin moved from the vicinity of the Kermadec Islands to the Chatham Islands between 6/3/63 and 9/3/63 (N.Z. Met. Service, 1963). This cyclone varied in intensity but was very deep whilst passing the Kermadec Islands and East Cape (North Island). Immediately following the passage of this cyclone a westerly airstream began flowing over central New Zealand. The petrel was probably swept southwards from near the Kermadec Islands by gale force northerly winds associated with the depression. It may then have been carried north-westwards towards New Zealand and through Cook Strait into the Tasman Sea as the depression lay near the Chatham Islands. Finally the petrel was wrecked on the west coast of Wellington Province by westerly winds over the Tasman Sea.

A somewhat similar weather sequence preceded the discovery of the Waikanae specimen: a tropical cyclone passed down the west coast of the North Island from the 6th to the 8th of March, 1954; north-easterly gales affected most of the North Island on 6 and 7/3/54; following the passage of this cyclone a disturbed westerly airstream moved onto New Zealand (N.Z. Gazette, 1954).

Thus weather conditions preceding the discovery of both these specimens are consistent with displacement of the birds from an origin north of the North Island.

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— M. J. IMBER

ANOTHER LITTLE WHIMBREL AT MIRANDA

The tide was falling at the old Lime Works site on 4/1/66 and most of the hundreds of roosting waders had left for the mudflat feeding grounds when a New Zealand Dotterel (*Charadrius obscurus*) and another bird of rather similar size were noticed at the end of a low shell spit by the Miranda creek. E. K. S. (Ken) Rowe of Rangiora, his family and the writer approached and easily identified it as a Little Whimbrel (*Numenius minutus*). From some distance it was seen that it had broad light bands above its eyes and a slight but clear light median stripe on the upper crown but not forward onto the front of the head; its upper surface and breast were a strong brown, the belly lighter. The bill was about two inches long and curved only moderately. Ken Rowe and one of his sons crept up to within a few yards and verified these points. It did not call when it flew.

Near the same place it was seen again and recognised by A. M. C. ("Mike") Davis of Auckland on 9/1/66.

On 11/1/66 a party of New Zealand watchers had the pleasure of studying this bird with Dr. Roger Tory Peterson, Dr. Olin Sewall Pettingill and Mrs. Pettingill of U.S.A. The visitors were particularly interested because this bird is the Asiatic counterpart of their Eskimo Curlew (*Numenius borealis*) which was gunned to near-extinction or perhaps complete extinction. On this occasion the Little Whimbrel was first seen on the top of a high shell ridge on the beach, again with the tide falling. It flew inland to the well-known Miranda Pools where Mrs. Beth Brown located it with a family of Pied Stilts only a few yards inside the road fence. Further notes were made to the effect that its legs were blue grey, the latter half of the bill flesh coloured and the forward part brown, the back patterned brown and grey, the brown being somewhat rufous. It was very tame.

On its favourite shelly ridge it was studied at leisure at a few yards on 28/1/66 by R. B. Sibson.

The last sighting was at the Miranda Pools on 8/2/66 when it flew from rough ground close to Mr. and Mrs. W. Davidson, Minn., U.S.A., Misses D. and E. Roberts and A. J. Goodwin; John and Beth Brown, Mrs. H. M. McK. and H. R. McK.

It was noted by the writer that the bill of this bird was appreciably less curved than that of the one seen on 28/3/64 at Karaka, Manukau Harbour (*Notornis* 11, 99) and the one, presumed to be the same as the one of 28/3/64, seen at Miranda on 13/10/64 (*Notornis* 12, 110). According to what is known of normal growth in the genus *Numenius* this may indicate that the present bird is in its first year.

— H. R. MCKENZIE



PECTORAL SANDPIPERS INLAND IN HAWKES BAY

On the morning of 17/1/66 I noticed from the Porangahau road numerous White-faced Herons and scores of Pied Stilts in the shallows along the eastern shore of Lake Hatuma, near Waipukurau; and I was fortunate in finding a grassy 'public road' which led directly down to the edge of the lake. The seasonal recession of the water level had occurred, leaving exposed quantities of shells of dead freshwater mussels (Kakahi), which along one stretch were so thick that they almost formed a beach. Here about a dozen Black-billed Gulls

(*L. bulleri*) were resting and a scattered flock of c. 80 Banded Dotterels (*C. bicinctus*) was feeding among the short herbage or over the bare mud; and while I was carefully glassing them in the hope perhaps of finding a Black-fronted Dotterel (*C. melanops*) among them — I didn't; and so far there is virtually no evidence that Banded and Black-fronted Dotterels flock together after the breeding season in Hawkes Bay — I noticed two sandpipers feeding close together on the wetter mud; and then, partly hidden by a tussock a few yards further away, a third sandpiper.

The first two had strongly marked gorgets of dense spotting; the chest markings of the third were little more than a buffy wash. I was able to study the three at leisure at a range of about fifty feet; and so to note other differences which confirmed that two were American Pectoral Sandpipers (*C. melanotos*) and one a Sharp-tailed Sandpiper (*C. acuminata*). The legs of *melanotos* were yellower and their bills slightly robuster, with a yellowish tone showing at the base. *Acuminata* was the odd man out not only in markings, but also in behaviour; for while the three sometimes flew together, the two Americans on alighting rested or fed close together, while the Siberian kept rather apart.

As these Sandpipers in New Zealand are primarily birds of brackish coastal lagoons, it was interesting to find both species about twenty miles inland. There is obviously a good deal of wader migration up and down the east coast of the North Island; along which estuaries and lagoons, such as Porangahau, Westshore, Ahuriri, Whakaki, Muriwai, provide resting places at conveniently spaced intervals. Strong east winds might push tired migrants inland. If they were lucky enough to find such a quiet and well-stocked feeding ground as the shallows of Lake Hatuma, they might stay for weeks or even months.

— R. B. SIBSON



REVIEWS

Gillham, Mary E., 1963 — *Instructions to Young Ornithologists IV. Sea-Birds*. Museum Press Ltd., London, 144 pp.

Dr. Gillham will still be known to readers of *Notornis* for her pioneering work carried out a few years ago on the effect of various colonially nesting birds on the plant ecology of sea-birds' nesting sites in New Zealand and elsewhere.

The present book is a part of a series on ornithology for beginners, initiated by the Brompton Library, which has already covered other aspects such as biology and behaviour. Although primarily written for young ornithologists in Britain, this volume contains much information on birds from New Zealand and Australian seas.

The book rightly begins with a classification of sea-birds, followed by chapters devoted to description of various ways of flying and feeding habits of sea-birds. These chapters are succeeded by a description of sea-birds on land and by a succinct final chapter on their breeding habits. These descriptions are accompanied by eminently pleasant and useful line drawings and a number of original photographs. The book concludes with appendices giving a map of sea-birds localities round the British Isles, a glossary and a good index.

One may regret the complete omission of scientific names, while the author devotes a whole chapter to sea-bird classification; the few publications on sea-birds other than those round the British Isles recommended for further reading; or the somewhat sketchy description of bird-banding without references. These are, however, minor omissions, without detracting from the value of this readable and useful little book.

— KAZIMIERZ WODZICKI

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A Field Guide to Fiji Birds by Robin Mercer, Govt. Press, Suva, 1965.

Once again ornithology leads the way. No. 1 of the Fiji Museum Special Publication Series is Robin Mercer's Field Guide. The author is well-known to several visiting ornithologists from N.Z. whom he has often helped.

This handy, compact booklet is concerned mainly with forest and garden birds of the larger islands. Sixty-eight species, including nine introduced aliens, are discussed. It is not surprising that among the hundreds of far-flung islands of the Fiji group subspeciation is well marked; and the problem arises, especially with the splendid parrots of the genus *Prosopea* which have several strongly marked insular forms, "When is a subspecies not a subspecies; but worthy of full specific status?"

A special section mentions six migratory waders; but as the author remarks, "there are undoubtedly many other species which must pass through." Since the text of the guide was completed, the occurrence of the N.Z. Banded Dotterel (*C. binctus*) has been reported in *Notornis* (XIII, 162).

The sea-birds are listed separately. Only a few species are commonly seen in coastal Fijian waters; but more than twenty species occur as breeders or migrants; and to learn more of their distribution and movements is a major task.

With its 14 illustrations which are photographs of the stylish and historic water-colours painted by W. J. Belcher, this pocket companion provides sound information to the eager traveller, who has eyes to see and ears to hear.

— R.B.S.

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A Sketchbook of New Zealand Birds, by Molly Falla, A. H. & A. W. Reed. 14/6.

If you are the wife of a well-known ornithologist, you may expect to be the recipient, willy-nilly, of numerous avian waifs and strays. It is, therefore, not surprising that over the years Molly Falla has acted as nurse or foster-mother to a strange variety of young or injured birds and the Falla home has served as an orphanage for a truly representative selection of the New Zealand avifauna. This book, which is both earnest and gently humorous, has grown out of the writer's experiences, as she observed the growth, convalescence and behaviour of her patients and their response to her care and kindness.

Molly Falla has been making a name for herself as a painter of birds; and here we have confirmation of her reputation. It was a

young Kea which inspired her with the real desire to paint; but she knew that if she was to understand anatomy and feather arrangement, she must study dead specimens; and so she began the hard way — with a dis-interred Kingfisher! She stresses the difficulty of reproducing the iridescent hues which are present in the living plumage of so many New Zealand birds; and she asks the very pertinent question, "What are a bird's true colours?"

It is a safe forecast that this slim, elegant volume, the like of which has not appeared in this country before, will be widely read and enjoyed.

— R.B.S.



NOTES

NOTE BY THE HONORARY TREASURER

In my report for the nine month period ending 31/12/65 I have mentioned that there is a surplus of £37 but that in this shortened year some items of income and expenditure, including subscriptions, were at the rate for twelve months. Printing and distributing "Notornis" was at the rate for nine months. Exact figures to 31/3/66, which would have been the date for a full year, have since become available and show that at the present rate of income and expenditure an average annual loss of approximately £180 will be made. This will quickly reduce capital and consequently also the considerable income now being received annually from such capital by way of investments.

(Signed) H. R. McKENZIE,
Hon. Treasurer.



A NEW TREASURER WANTED

After many years of sterling service to the Society as Treasurer, Member of Council, and guide philosopher and friend to all, Mr. Ross McKenzie retired on 31st August, so that the appointment is now vacant. Would any member prepared to consider undertaking the duties kindly communicate with either the President or the Secretary. Every assistance will be afforded to a new Treasurer, who may, if he or she wish, recommend to Council a suitable person to be Assistant Treasurer, for the handling of members' subscriptions and other routine matters. The system of accounts is simplified, so that no wide knowledge of book-keeping is necessary.



KERMADECS EXPEDITION 1966

Arrangements for the Kermadecs Expedition are now well advanced, with the departure date rapidly approaching. H.M.N.Z.S. 'Endeavour' is to transport the party to Raoul Island on 8th November, and they will return in late January on H.M.N.Z.S. 'Inverell.'

The Expedition Sub-Committee was faced with a major change in plan, as it was found that the establishment of a base camp near the Meteorological Station, and the use of its landing facilities, was not possible. It has therefore been decided to establish a base at Denham

Bay, the only other locality in the Group where fresh water is available. The party is thus faced with the difficulty of a beach landing, which can be made at the north end of the bay under reasonable conditions, and with the help of a technique developed by the Wildlife party which recently landed on Macauley Island under very adverse conditions. It was here that Tom Iredale and party landed in 1910, and spent ten months on the only comprehensive ornithological work that has been done in the Kermadecs.

Owing to the change mentioned above, personnel has had to be severely restricted, so that the party will consist of 9 members, compared with 13 in the 1964 Expedition. Those selected are: D. V. Merton, Leader; Dr. M. F. Soper, Photographer and Medical Officer; W. V. Ward, Sound Recording and Cine Photographer, J. A. Peart, D. E. Crockett, J. F. Anton, Ornithologists; W. R. Sykes, Botanist; and Dr. J. C. Watt, Entomologist. A scientific leader has yet to be appointed.

The funds generously contributed by members of the Society in 1964 will largely meet the expenses of the present expedition, but if any further members wish to give their active support, subscriptions will be gratefully received.

— A.B.



A NOTE ON THE CHRISTMAS CARD

Mr. Murray-Oliver, Public Relations Officer of the Alexander Turnbull Library, has submitted the following note on the Heaphy painting which has been chosen as the Society's Christmas Card for this year.

“KAKARIKI FROM SHIP COVE AND TE AWAITI, August 1839”

from the original watercolour by Charles Heaphy, V.C.,
in the Alexander Turnbull Library, Wellington, N.Z.

“Charles Heaphy, V.C. (1820-1881), arrived in New Zealand in August 1839, having been appointed artist and draughtsman to the N.Z. Company. For forty years he was prominent in public life in the new colony. He was Member of the House of Representatives for Parnell for one term, and held many important Government posts. Heaphy gained the V.C. in the Waikato Wars, this being the first occasion on which it was awarded to a Volunteer. Many of his fine watercolours were made for the Company in the course of his early explorations and surveying work. The Alexander Turnbull Library owns 50 paintings by Heaphy and there is also a large number in the Sir George Grey collection in the British Museum, although few appear to be in private hands.

Because of its date, I have always liked to think that this may have been his first painting in New Zealand. One would expect the exotic and colourful to appeal to a newly-arrived, young and perhaps romantically-inclined artist. He was only 19 then.”

SUMMARY

USE OF BANDING SCHEMES WITH PARTICULAR REFERENCE
TO RED-BILLED GULLS

The banding of Red-billed Gulls started in New Zealand in 1943. A small number (73) were banded by the speaker at Nelson between 1943 and 1945, and subsequent checks on this small group of banded birds has proved most informative. Between 1950 and 1958 one or two hundred Red-billed Gulls were banded annually, but in 1958 more than a thousand were banded. The returns then started to come in more frequently and the potential of the species as a suitable subject for a special banding study was realised and it was chosen as a special O.S.N.Z. project in 1960. A five year colour banding scheme was launched and to date 21,085 birds have been banded and 4,778 returns have been recorded.

The various uses that could be made of this data, its possibilities and limitation were then discussed. The question of longevity of this species was considered. Band wear and loss, however, greatly reduced the value of the results to date and the answers to this question are still to be provided. With the use of monel metal bands this should be overcome in the future. The knowledge of the extent, pattern and rhythm of dispersal of this species in New Zealand has been greatly enhanced by banding. The certain identification of individuals made possible by banding has told us much about its breeding biology. Information is now available about age of first breeding, number of years that individual birds breed, attachment to natal colony, position within the colony and general breeding success. Plumage and soft part cycles are now well documented because banded birds of known ages were able to be identified with certainty.

The prospects for the future of this scheme were then outlined. It was stressed that it was a co-operative effort and that it depended on the goodwill of many people. The speaker then concluded with thanks to all members who had contributed to the success of that scheme in the past.

— L. GURR

**LITERATURE AVAILABLE**

Back Numbers of Notornis at 5s. each. Large orders for full or part sets at special prices.

Reprints of "Kermadecs Expedition, Nov. 1964," by A. T. Edgar, at 4/6d.

O.S.N.Z. Library Catalogue, 70 pp., at 5s.

Banding Reports, Nos. 8-14. 5/- each. (Nos. 1-7 are incorporated in early journals). Order from Mrs. H. R. McKenzie, Box 45, Clevedon.